USDA

United States Department of Agriculture

Forest Service

**Northeastern Area**
State & Private Forestry

National Wood In Transportation Information Center

Morgantown, WV

In cooperation with the Pennsylvania Department of Conservation and Natural Resources

Pennsylvania Rural Development Council

Harrisburg, PA

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# Standard Plans for Glulam Timber Pedestrian Bridges

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Perry D. Schram, P.E.

## Abstract

The development of standardized pedestrian timber bridge plans and specifications is a key element in improving design and construction practices. The bridge plans presented were developed as a cooperative effort between the USDA Forest Service, Wood In Transportation (WIT) program; The Pennsylvania Department of Conservation and Natural Resources (DCNR); the Pennsylvania Rural Development Council (PRDC); and Powers & Schram Inc., Consulting Engineers. This publication contains standardized designs and details for two timber bridge superstructure types, including longitudinal glued-laminated timber (glulam) stringer bridges with transverse timber decks, and longitudinal glulam panel bridges. The set of standards encompasses numerous span length and width combinations, design loads for an AASHTO H-10 vehicle, and pedestrian live loads.

Keywords: Timber, bridge, pedestrian, glulam, red maple, southern pine, Douglas-fir

*Cover Photo: Jacobsburg Environmental Education Center Pedestrian Timber Bridge, Pennsylvania Department of Conservation aand Natural Resources, Belfast, Pennsylvania*

These designs are intended for information purposes only and must be verified by a registered professional engineer.

February 2000



**Pennsylvania Department of Conservation and Natural Resources**

**Pennsylvania Rural Development Council**

**Wood In Transportation Program**

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## GENERAL INFORMATION

1. Use this series of standard drawings to provide a rapid means of producing design drawings for single span timber pedestrian and bike/emergensy vehicle bridges in the 3.0 m to 18.0 m span range. By selecting the appropriate standard format plan sheets and inserting basic geometry and job specific information, the designer generates a complete set of contract drawings ready for construction.

2. All dimensions for this series are shown in millimeters unless otherwise noted.

3. The bridge types in this series utilize glulam timber components as basic elements of the superstructure. Standardized abutments are provided to assist the Engineer with the abutment design. With three types of superstructures and interchangeable abutments from which to choose, the designer should be able to adapt the standards to fit most single span applications.

4. The lamination process utilized in glulam timber production enhances the structural efficiency of the timber bridge design. The process permits optimum use of higher grade lumber material in the beam's highly stressed cross–sectional zones. Use of effective treatments maintains maximum service life or exposure durability by resisting and controlling decay, insect attack, and other environmental weathering factors. Furthermore, a bituminous wearing surface or a select surface prolongs timber deck life by minimizing adverse abrasion and mechanical wear, and provides added traction upon wet or icy deck surfaces.

5. Use these glulam timber standards for pedestrian and bike/emergency vehicle stream crossings with the following general limitations.

   1. Bridge curb to curb widths of 1220 mm, 1625 mm & 3600 mm.
   2. Angles of intersection (skew) not less than 45 degrees
   3. Spans 3.0 m to 18.0 m.

6. Select one of the two possible assembly types for the bridge superstructure: glulam beam with transverse glulam deck (102M), or glulam panel (103M),

   Use the first bridge superstructure, glulam beam, for spans 3.0 m to 18.0 m. This superstructure composition consists of glulam timber beams and a transverse timber deck. The glulam beam system characteristically has a large depth–to–span ratio due to the relativly low bending strength of wood compared to steel. In some cases, vertical clearance restrictions may rule out the use of this structure type because of the excessive superstructure depth. Where vertical clearance is a problem, consider the use of the glulam panel superstructure.

   For short spans of 3.0 m to 6.0 m, use the second type of bridge superstructure, a longitudinal hardwood glulam panel, to effectively reduce the depth of the timber superstructure. The longitudinal panel acts as a timber slab structure with a relatively shallow profile.

7. Use the Bridge Rail Details which are shown on the drawings in series 104M.

8. The pile substructure details provided with these standard drawings assist in the design of safe, low cost bridge abutments in many cases. Unfortunately, foundation conditions are not always suitable for this abutment type, therefore, consider an alternate substructure design. Be aware of required pile embedment length in selecting pile abutment sites. Failure to attain the required pile embedment length due to bedrock or a very dense soil stratum close to the ground surface causes an unacceptable lateral pile movement. To avoid such problems, verify the ability to reach the minimum required embedment length as required by stream scour or soil conditions before selecting a substructure type.

9. Consider the potential for pile damage during driving in determining suitability of timber pile abutments. Use timber piles ideally as friction piles in areas free of boulders or other such obstructions during driving. Employ timber piles with caution where pile tips reach bedrock or a very dense stratum before attaining the required friction embedment length. When such contact occurs, driving resistance and the risk of pile damage increases rapidly. To minimize the possibility of pile damage, drive timber piles to the maximum permitted driving resistance (MPDR) Do not drive beyond the MPDR.

10. Submit a completed set of drawings assembled from these standards to a registered professional engineer for review and approval to ensure adequate design, and perform a subsurface investigation prior to beginning the foundation design.

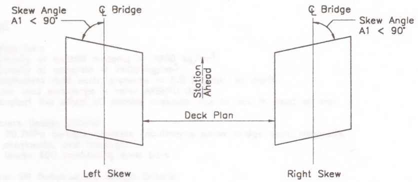
## INSTRUCTIONS FOR STANDARDS USE

Before using these standards, obtain basic survey, geometric data, and soils information for the proposed construction site. If the site is suitable for a timber bridge, choose one of the available timber superstructure types. If vertical clearance is a problem, use the longitudinal panel type, if feasible.

Design of substructure units is based on the material parameters and soil conditions shown on 100M, sheet 2. Compute scour depth when substructure units are exposed to stream currents. Provide adequate embedment for substructure units to resist the effects of scour and frost.

Referring to the Index of Sheets (see this sheet), standards are separated into design sheets and construction sheets. In addition to informational and instructional material, the design sheets include data assembly sheets for the standardized types of substructures and superstructures. These sheets contain the basic data and the equations necessary to generate the information required for the fill–in type construction sheets. Select the appropriate data assembly sheets and the appropriate construction sheets for the selected structure type.

Select the appropriate construction sheets for left, 90°, & right skewed structures. The skew angle for a left skewed structure is measured to the left of the bicycle path or walkway centerline while a right skew angle is measured to the right of the centerline. See the following sketch.




After selecting the necessary data assembly and construction sheets, produce final contract drawings. Observe the following steps in the preparation process:

A. Complete the data assembly sheets for the superstructure type selected.

   1. Fill in the control stations and elevations table.
   2. Complete the control dimensions table. Reference supplemental tables. Work the table from top to bottom.
   3. Choose a bridge rail type.
   4. Complete the quantities table.

B. Complete the data assembly sheets for the substructure type selected.

   1. Enter the abutment number in the drawing title block (a separate data assembly sheet is required for each abutment).
   2. Complete the control dimensions table. Refer to geometric equations and supplemental tables and figures as required.
   3. Complete the bar schedule table.
   4. Complete the substructure quantities table.

C. Transfer the appropriate information from the data assembly sheets to the fill–in spaces on the standard construction sheets.

   1. Information from the superstructure data assembly sheet should be placed in the appropriate fill–in slots in the standard superstructure drawings 102M or 103M. Coded letters and numbers are provided to facilitate the correct placement of dimensions and other data.
   2. Information from the substructure and superstructure data assembly sheets must also be transferred to the standard substructure drawings, 105M, 106M, 107M, or 108M, through the use of codes provided.
   3. If pile footings are required, the applicable driving method must be shown in the General Notes on the appropriate standard superstructure drawing. If pile load testing is required, pile load test data must be shown in a table near the General Notes. Estimated pile tip elevations should be shown on core boring log plots when included as part of the design drawings.
   4. Completion of the appropriate stakeout & bridge rail details drawings (series 104M), is accomplished by reference to the substructure & superstructure data assembly sheets.

D. Complete quantity estimates, add drawing titles and miscellaneous information.

   1. Compute quantities for excavation, structure backfill, and other items not specifically provided for on the data assembly sheets. Post all quantities in the approximate quantity table on the structure's quantities sheet.
   2. Customize the standard drawings by adding necessary location and route number information to the title block of each sheet. Number each sheet consecutively.
   3. Add necessary information pertaining to utilities, hydraulic data, and alignments.
   4. Add subsurface exploration information as required.

Include the completed data assembly sheets with the final set of contract plans produced from these standard drawings. The data assembly sheets follow the filled–in construction drawings and are numbered as part of the complete drawing set. Normally, no separate design calculations are required.

Determine and show the approximate location and type of the utility lines together with utility owner's names and address of all lines found within the construction area of the bridge. Show such lines on the structure General Plan sheet.

If the structure crosses a stream, the designer must obtain necessary permits from appropriate approval agencies. Show pertinent hydraulic data on the General Plan sheet.


PREPARED BY:
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# DESIGN CRITERIA

DESIGN SPECIFICATIONS – Design Division of 1994 AASHTO LRFD Bridge Design Specifications

## SUPERSTRUCTURE

Ia. Live Load (Typical Bike/Emergency Vehicle Bridge)

A. H Design Truck (Emergency Vehicle) load at strength 1 Load Combination (17.2kN front axle and 71.2kN rear axle spaced at 4.3m to 9.0m)

B. Pedestrian Load at Strength 1 Load Combination ($4.1 \times 10^{-3}$MPa)

Ib. Live Load (Typical Pedestrian Bridge)

A. Pedestrian Load at Strength 1 Load Combination ($4.1 \times 10^{-3}$MPa)

IIa. Dead Loads (Typical Bike/Emergency Vehicle Bridge)
–Bituminous surface of 90 kg/m$^2$
–Future wearing surface 150 kg/m$^2$
–Timber bridge components 800 kg/m$^3$
–Steel Bridge Components 7850 kg/m$^3$

IIb. Dead Loads (Typical Pedestrian Bridge)
–Optional select surface treatment (see note below) of 22.5 kg/m$^2$
–Future wearing surface 150 kg/m$^2$
–Timber bridge components 800 kg/m$^3$
–Steel Bridge Components 7850 kg/m$^3$

Note: select surface treatment is Percol Elastic Cement (Microsurfacing) by E.J. Breneman, Inc. (610-678-9691) or an approved equal. 10 mm thick max.

II Timber Design Criteria

A. Glulam Transverse Deck Design

1. Design deck thickness in accordance with AASHTO 4.6.2.1
2. Wet-Use Base Resistance & MOE (MPa)[1]

| | Douglas Fir (DF)[3] | Red Maple (RM)[2] | Southern Pine (SP)[3] |
|---|---|---|---|
| Bending (Fby) | 27.6 | 25.8 | 29.7 |
| Shear (Fvy) | 2.80 | 3.70 | 3.50 |
| Modulus of Elasticity (Ey) | 9650 | 8040 | 9650 |

1.) In-service moisture content > 16%
2.) Values generated from AITC's approved computer program "GLDesVal". Values reflect H6 glulam combinations of No. 2 (N2) grade lumber for RM. (Reference: Pennsylvania D.O.T., BLC-560M).
3.) Values from AASHTO Table 8.4.1.2.3-2 Value reflect 2 and 49 Glulam Combinations for Douglas Fir and Southern Pine respectively.

3. Nominal resistance and modulus of elasticity values obtained by adjusting wet-use base resistance values with applicable modification factors according to AASHTO 8.4.4.
4. Deflection less than or equal to span/425 and extreme relative deflection between adjacent deck panel edges less than or equal to 2.5 mm.

B. Solid Sawn Transverse Deck Design

1. Design deck thickness in accordance with AASHTO 4.6.2.1
2. Wet-Use Base Resistance & MOE (MPa)[1,2]

| | Douglas Fir (DF) | Red Maple (RM) | Southern Pine (SP) |
|---|---|---|---|
| Bending (Fby) | 17 | 17 | 19 |
| Shear (Fvy) | 2.10 | 2.10 | 2.10 |
| Modulus of Elasticity (Ey) | 10000 | 9300 | 10000 |

1.) In-service moisture content > 16%
2.) Values from AASHTO Table 8.4.1.2.3-2 Grade No. 2

3. Nominal resistance and modulus of elasticity values obtained by adjusting wet-use base resistance values with applicable modification factors according to AASHTO 8.4.4.
4. Live load deflection less than or equal to span/425 and extreme relative deflection between adjacent deck panel edges less than or equal to 2.5 mm.

C. Beam Design

1. Live load distribution for moment and shear in interior beams with wood decks, AASHTO table 4.6.2.2.2a-1
2. Live load distribution factor (deflection) = No. of lanes / No. of beams
3. Wet-Use Base Resistance & MOE (MPa)[1]

| | Douglas Fir (DF)[3] | Red Maple (RM)[2] | Southern Pine (SP)[3] |
|---|---|---|---|
| Bending (Fbx) | 37 | 37 | 37 |
| Shear (Fvx) | 3.10 | 4.17 | 3.80 |
| Comp. Perp. to the Grain (Fcp) | 6.20 | 8.33 | 6.20 |
| Modulus of Elasticity (Ex) | 10300 | 10300 | 10300 |

1.) In-service moisture content > 16%
2.) Design values based on published AITC 119-96 stresses for 24F-1.8E glulam combinations
3.) Values from AASHTO Table 8.4.1.2.3-1. Values reflect 24F V4 and 24F V3 glulam combination layups for Douglas Fir and Southern Pine, respectively.

4. Nominal resistance and modulus of elasticity values obtained by adjusting wet-use base resistance values with applicable modification factors according to AASHTO 8.4.4.
5. Live load deflection less than or equal to span/425.

D. Longitudinal Panel Design

–Live load distribution for moment = no. of loads / no. of equivalent strips, AASHTO 4.6.2.1.3

1. Wet-Use Base Resistance & MOE (MPa)[1]

| | Douglas Fir (DF)[4] | Red Maple (RM)[2] | Southern Pine (SP)[4] |
|---|---|---|---|
| Bending (Fby) | 27.6 | 25.8 | 29.7 |
| Shear (Fvy) | 2.80 | 3.70 | 3.50 |
| Shear (Combination lay-up) (Fvy) (3) | 1.50 | 1.90 | 1.70 |
| Comp. Perp. to the Grain (Fcp) | 5.17 | 6.61 | 5.17 |
| Modulus of Elasticity (Ey) | 9650 | 8040 | 9650 |

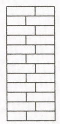
1.) In-service moisture content > 16%
2.) Values generated from AITC's approved computer program "GLDesVal". Values reflect H6 glulam combinations of No. 2 (N2) grade lumber for RM.(Reference: Pennsylvania D.O.T., BLC-560M).
3.) Shear values are for combination lay-up glulam lumber.
4.) Values from AASHTO Table 8.4.1.2.3-2 Value reflect 2 and 49 Glulam Combinations for Douglas Fir and Southern Pine respectively.

3. Nominal resistance and modulus of elasticity values obtained by adjusting wet-use base resistance values with applicable modification factors according to AASHTO 8.4.4.
4. Deflection less than or equal to span/425 and extreme relative deflection between adjacent edges less than or equal to 2.5 mm.

E. Net Dimensions of Southern Pine, Red Maple, & Douglas Fir Glued Laminated Timber

| Nominal Dimension (mm) | Net Minimum Finished Dimension (mm)[1] | Net Minimum Finished Dimension (mm)[2] |
|---|---|---|
| 100 | 79 | – |
| 150 | 130 | – |
| 200 | 175 | – |
| 250 | – | 219 |
| 300 | – | 264 |
| 350 | – | 314 |
| 400 | – | 365 |
| 450 | – | 410 |

1.) Single member lay-up
2.) Combination lay-up



COMBINATION LAY-UP

SINGLE MEMBER LAY-UP

IV Preservative Treatment

A. All sawn lumber shall be treated in accordance with the requirements of AWPA Standard C14 with one of the following preservatives:

1. Creosote conforming to AWPA Standard P1.
2. Pentachlorophenol conforming to AWPA Standard P8 in hydrocarbon solvent, Type A, conforming to AWPA Standard P9.

B. Treated material shall be free of excess preservative on the wood surface. The treating process for these preservatives shall include an expansion bath, steaming and/or dripping to minimize bleeding.

C. Treated wood shall be inspected and certified in accordance with AWPA Standard M2.

V Elastomeric Bearing Pads

A. Material

1. Elastomer – 50 durometer hardness on Shore A scale

## SUBSTRUCTURE

I Design Data
–Density of backfill material = 1900 kg/m$^3$
–Density of concrete = 2400 kg/m$^3$
–Equivalent fluid earth pressure = 5.5 Pa/mm of depth
–Live load surcharge = refer AASHTO 3.11
–Neglect the effect of passive pressure due to soil in front of wall.

II Concrete Design Criteria
– 20.7MPa cement concrete (abutments below bridge seat, wingwalls, cheekwalls, and footings).
– Grade 400 reinforcing steel bars

III Timber Sill Substructure Design Criteria

A. Bearing Sill

1. Design timber bearing sill to act as a continuous beam over the timber piles. The proposed method of timber pile placement is to provide a timber pile at each abutment/wingwall intersection and then place the neccessary number of interior piles at equal spaces (see pile design criteria).
2. For solid sawn lumber use Wet-Use Base Resistance & MOE from AASHTO Table 8.4.1.1.4-1
3. Glulam Wet-Use Base Resistance & MOE (MPa)[1]

| | Douglas Fir (DF)[3] | Red Maple (RM)[2] | Southern Pine (SP)[3] |
|---|---|---|---|
| Bending (Fbx) | 30.3 | 18.2 | 32.1 |
| Shear (Fvx) | 3.1 | 3.4 | 3.8 |
| Modulus of Elasticity (Ex) | 9650 | 7500 | 9650 |

1.) In-service moisture content > 16%
2.) Design values based on published AITC 119-96 stresses for H6 glulam combinations
3.) Values from AASHTO Table 8.4.1.2.3-2 Value reflect 2 and 49 Glulam Combinations for Douglas Fir and Southern Pine respectively.

4. Obtain nominal resistance and modulus of elasticity values by adjusting wet-use base resistance values with applicable modification factors according to AASHTO 8.4.4.

B. Timber Lagging

1. Use Wet-Use Base Resistance & MOE from AASHTO Table 8.4.1.1.4-1
2. Obtain nominal resistance and modulus of elasticity values by adjusting wet-use base resistance values with applicable modification factors according to AASHTO 8.4.4.

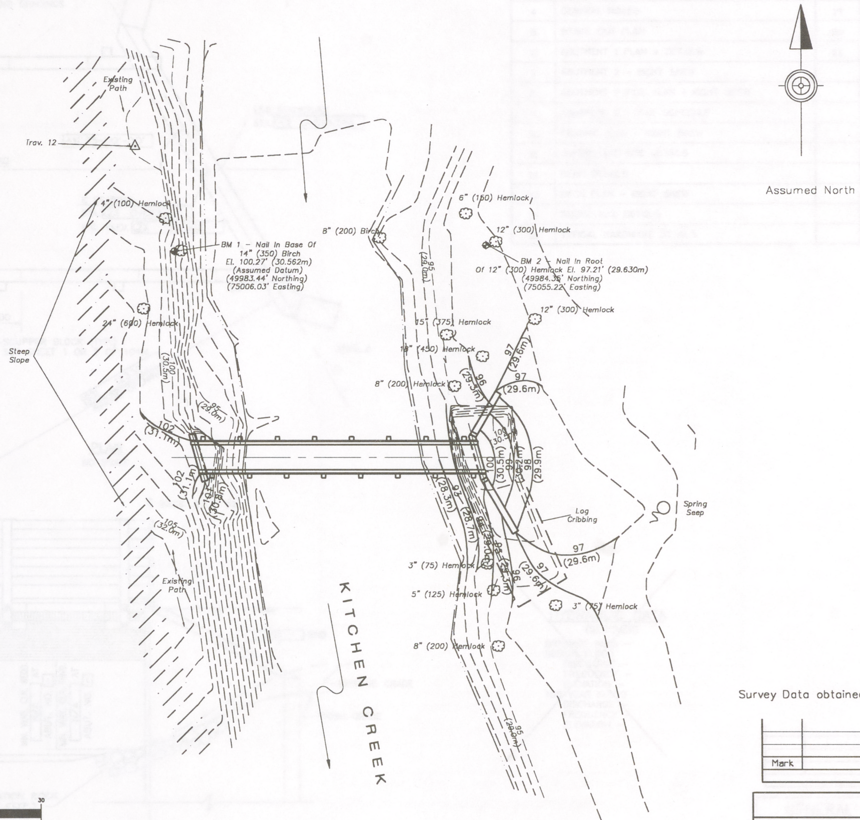
C. Timber piles

1. Provide piles in accordance with AASHTO M168
2. Use Wet-Use Base Resistance & MOE from AASHTO Table 8.4.1.3-1
3. Obtain nominal resistance and modulus of elasticity values by adjusting wet-use base resistance values with applicable modification factors according to AASHTO 8.4.4.
4. All piles are 300 mm diameter timber (dia. measured 900 mm from butt.)
5. Obtain approval of pile driving criteria from Engineer prior to construction.
6. Provide applicable pile driving notes.

D. Steel piles

1. Provide piles in accordance with AASHTO 10.7
2. All piles are HP 254x63
3. Obtain approval of pile driving criteria from Engineer prior to construction.
4. Provide applicable pile driving notes.

PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA




GRAPHIC SCALE

20 10 5 0 10 30

( IN FEET )
1 inch = 10 ft.
1:120 (METRIC)

NOTE: Topographic Survey was done in U.S Customary Units. Metric elevations are shown in parenthesis(). All metric units are in millimeters unless otherwise noted.

Survey Data obtained by Larson Design Group on October 10, 1997

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

SITE PLAN

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

| ISSUED: 4/9/98 | JOB: 97012 | SCALE: AS SHOWN |
|---|---|---|
| FILE: 9701201.DWG | DRAWN BY: JLV | CHECKED BY: PSP |

SHEET 1 of 21

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
PATRICK SHAWN POWERS
ENGINEER

ENGINEER'S SEAL

THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.


PREPARED BY:
POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

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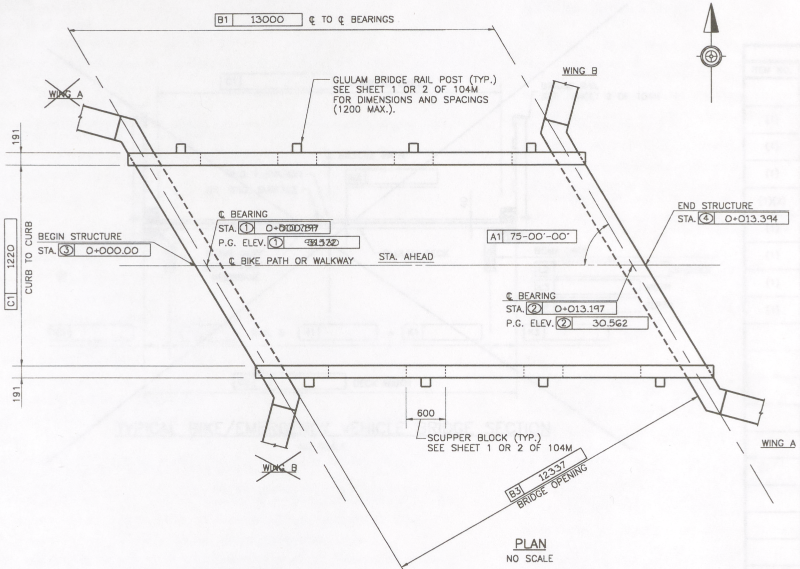
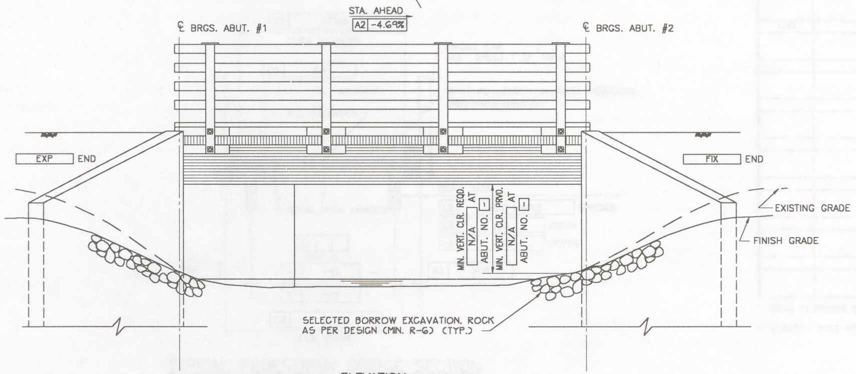
| 14 | BRIDGE RAIL DETAILS | | |
| 15 | TYPICAL HARDWARE DETAILS | | |




PLAN

NO SCALE




ELEVATION

NO SCALE

HYDRAULIC DATA
(DESIGNER)
DRAINAGE AREA -
DESIGN FLOOD
DISCHARGE -
FREQUENCY -
ELEVATION -
100 YEAR FLOOD
DISCHARGE -
FREQUENCY -
ELEVATION -

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

GENERAL PLAN & ELEVATION - RIGHT SKEW

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 3 | GLULAM BEAM SUPERSTRUCTURE |

ENGINEERING SEAL

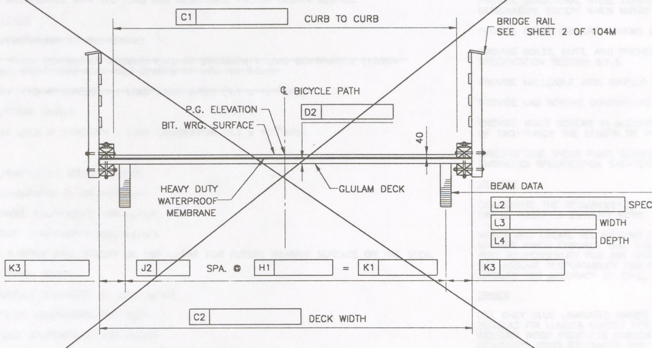
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER PATRICK SHAWN POWERS

SIGNATURE & DATE


PREPARED BY:
POWERS + SCHRAM INC.
CONSULTING ENGINEERS
2545 N. ATHERTON STREET, SUITE 101
STATE COLLEGE, PA 16801
PHONE: (814) 238-1170
PHONE: (814) 238-1175
e-mail: powers@vicon.net

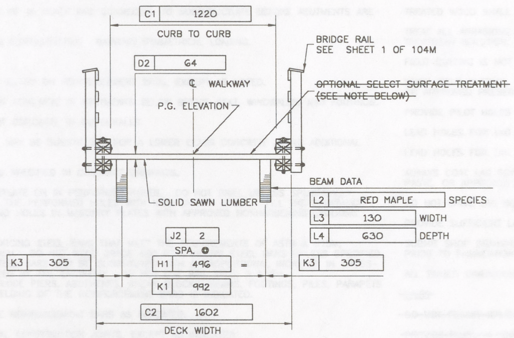


PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA




## TYPICAL BIKE/EMERGENCY VEHICLE BRIDGE SECTION

NO SCALE




## TYPICAL PEDESTRIAN BRIDGE SECTION

NO SCALE

~~NOTE: SELECT SURFACE TREATMENT IS PERCOL ELASTIC CEMENT (MICROSURFACING) BY E.J. BRENEMAN, INC. (610-678-9691) OR AN APPROVED EQUAL. (10 mm THICK MAX.)~~

| APPROXIMATE QUANTITIES – BRIDGE STRUCTURE, AS DESIGNED | | | | | | |
|---|---|---|---|---|---|---|
| ITEM NO. | ITEM | UNIT | ABUT. 1 | ABUT. 2 | SUPERSTRUCTURE | TOTAL |
| | BRIDGE STRUCTURE AS DESIGNED | LS | | | | LS |
| (1) | GLUE LAMINATED TIMBER BEAMS | $m^3$ | ------ | ------ | 3.25 | 3.25 |
| (1) | GLUE LAMINATED TIMBER | $m^3$ | ------ | ------ | 0.20 | 0.20 |
| (1) | SOLID SAWN TIMBER | $m^3$ | ------ | ------ | 3.64 | 3.64 |
| (1)(2) | BEARING PLATE ASSEMBLIES | kg | ------ | ------ | 63.45 | 63.45 |
| (1) | SELECT SURFACE TREATMENT | kg | ------ | ------ | N/A | N/A |
| (1) | 152 um POLYURETHANE | $m^2$ | ------ | ------ | 3.34 | 3.34 |
| (1) | HEAVY DUTY WATERPROOF MEMBRANE | $m^2$ | ------ | ------ | N/A | N/A |
| (1) | BITUMINOUS WEARING COURSE | kg | ------ | ------ | N/A | N/A |
| | CLASS 3 EXCAVATION | $m^2$ | ----- | 20 | N/A | 20 |
| | CLASS AA CEMENT CONCRETE | $m^3$ | 0.18 | 0.18 | N/A | 0.36 |
| | CLASS A CEMENT CONCRETE | $m^3$ | ----- | 63.41 | N/A | 63.41 |
| | SELECT BORROW EXCAVATION, STRUCTURE, BACKFILL | $m^3$ | 1 | 15 | N/A | 16 |
| | NO. 57 COURSE AGGREGATE | $m^3$ | ----- | 1.6 | N/A | 1.6 |
| | REINFORCEMENT BARS | kg | ----- | 3606616 | N/A | 3606616 |
| | REINFORCEMENT BARS, EPOXY COATED | kg | 2700 | 937453 | N/A | 940153 |
| AND | | | | | | |

1. ITEMS IN BRIDGE STRUCTURE LUMP SUM ITEM GIVEN FOR INFORMATION ONLY.

2. QUANTITY DOES NOT INCLUDE ANY CONNECTION HARDWARE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

TYPICAL SECTION & QUANTIES

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER PATRICK SHAWN POWERS

ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 4 | GLULAM BEAM SUPERSTRUCTURE |



THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

## GENERAL NOTES:

DESIGN SPECIFICATIONS

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (1994)

DESIGN IS IN ACCORDANCE WITH THE LOAD AND RESISTANCE FACTOR DESIGN METHOD.

DESIGN LIVE LOADS

~~TYPICAL BIKE/EMERGENCY VEHICLE BRIDGE~~

~~H DESIGN TRUCK (EMERGENCY VEHICLE) LOAD AT STRENGTH 1 LOAD COMBINATION (17.2KN FRONT AXLE AND 71.2KN REAR AXLE SPACED AT 4.3m TO 9.0m)~~

~~PEDESTRIAN LOAD AT STRENGTH 1 LOAD COMBINATION (4.1 x $10^{-3}$ MPa)~~

TYPICAL PEDESTRIAN BRIDGE

PEDESTRIAN LOAD AT STRENGTH 1 LOAD COMBINATION (4.1 x $10^{-3}$ MPa)

DEAD LOADS

TYPICAL BIKE/EMERGENCY VEHICLE BRIDGE

~~BITUMINOUS SURFACE OF 90 kg/m²~~

TIMBER BRIDGE COMPONENTS 800 kg/m³

STEEL BRIDGE COMPONENTS 7850 kg/m³

INCLUDES SURFACE AREA DENSITY OF 150 kg/m² FOR FUTURE WEARING SURFACE ON THE DECK.

TYPICAL PEDESTRIAN BRIDGE

SELECT SURFACE TREATMENT OF 22.5 kg/m²

TIMBER BRIDGE COMPONENTS 800 kg/m³

STEEL BRIDGE COMPONENTS 7850 kg/m³

INCLUDES SURFACE AREA DENSITY OF 150 kg/m² FOR FUTURE WEARING SURFACE ON THE DECK.

GENERAL

PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH AASHTO/AWS/DI.5-88 BRIDGE WELDING CODE, AND CONTRACT SPECIAL PROVISIONS.

NOTIFY THE REGIONAL HEADQUARTERS OF THE FISH COMMISSION PRIOR TO CONSTRUCTION AND COOPERATE WITH FISH COMMISSION DURING CONSTRUCTION OF BRIDGES OVER FISHABLE STREAMS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL AND IN MILLIMETERS UNLESS OTHERWISE NOTED.

SUPERSTRUCTURE DIMENSIONS SHOWN ARE FOR NORMAL TEMPERATURE OF 20° C.

SPREAD FOOTINGS MAY BE ORDERED BY THE ENGINEER TO BE AT ANY ELEVATION OR OF ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION.

THE SUPERSTRUCTURE MUST BE IN PLACE AND CONNECTED TO SUBSTRUCTURE BEFORE ABUTMENTS ARE BACKFILLED.

BACK FILL BOTH ABUTMENTS CONCURRENTLY. MAINTAIN SYMMETRICAL LOADING.

CONCRETE

PROVIDE 50 mm CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.

USE CLASS 20.7MPa CEMENT CONCRETE IN ABUTMENTS BELOW BRIDGE SEAT, WINGWALLS, AND FOOTINGS.

USE CLASS 24.1MPa CEMENT CONCRETE IN CHEEKWALLS.

A HIGHER CLASS CONCRETE MAY BE SUBSTITUTED FOR A LOWER CLASS CONCRETE AT NO ADDITIONAL COST TO THE OWNER.

PREPARE BEARING AREAS AS SPECIFIED IN CONTRACT DRAWINGS.

SET ANCHOR BOLTS TO TEMPLATE OR IN PERFORMED HOLES. DO NOT DRILL UNLESS SPECIFICALLY INDICATED ON PLANS. FILL THE PERFORMED HOLES WITH NON-SHRINK GROUT. FILL THE CLEARANCE BETWEEN ANCHOR BOLTS AND HOLES IN MASONRY PLATES WITH APPROVED NONHARDENING CAULKING COMPOUND.

PROVIDE GRADE 400 REINFORCING STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A 615M, A 616M, A 617M AND A 706M. DO NOT WELD GRADE 400 REINFORCING STEEL BARS UNLESS SPECIFIED. GRADE 300 REINFORCING STEEL BARS MAY BE SUBSTITUTED WITH A PROPORTIONAL INCREASE IN CROSS-SECTIONAL AREA, IF APPROVED BY THE ENGINEER. DO NOT USE RAIL STEEL A 616M REINFORCEMENT BARS IN BRIDGE PIERS, ABUTMENTS, SHEAR BLOCKS, BEAMS, FOOTINGS, PILES, PARAPETS AND WHERE BENDING OR WELDING OF THE REINFORCEMENT BARS IS INDICATED.

EPOXY-COAT SUBSTRUCTURE REINFORCEMENT BARS AS INDICATED.

RAKE-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS INDICATED.

REINFORCEMENT BAR SCHEDULE IS FOR INFORMATION ONLY. VERIFY IT PRIOR TO BIDDING AND FABRICATION.

PLACE CHEEKWALL CONCRETE AFTER BEAMS ARE SET IN POSITION.

CHAMFER EXPOSED CONCRETE EDGES 25 mm BY 25 mm, EXCEPT AS NOTED.

PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH OF 30 DIAMETERS OR IN ACCORDANCE WITH ASSHTO SECTION A5.11 AND D5.11, WHICHEVER IS GREATER.

## GENERAL NOTES CONTINUED:

STEEL

HOT DIP GALVANIZE ALL TIMBER CONNECTION HARDWARE.

PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270, GRADE 250 (ASTM A709M, GRADE 250) DESIGNATION, EXCEPT WHEN NOTED OTHERWISE.

PROVIDE BOLTS AND LAG SCREWS CONFORMING TO ASTM A307 DESIGNATION, EXCEPT WHEN NOTED OTHERWISE.

PROVIDE BOLTS, NUTS, AND WASHERS IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATION SECTION 6.4.3.

PROVIDE MALLEABLE IRON WASHER CONFORMING TO ASTM A47M, GRADE 24118.

PROVIDE LAG SCREWS CONFORMING TO ANSI B18.2.1 – 1981.

PROVIDE WOOD SCREWS IN ACCORDANCE WITH ANSI/ASME B18.6.1. WITH A MINIMUM THREADED PORTION OF TWO-THIRDS THE LENGTH OF THE SHAFT.

MANUFACTURE SHEAR PLATE CONNECTORS FROM PRESSED STEEL MEETING SOCIETY OF AUTOMOTIVE ENGINEERS SPECIFICATION SAE-1010 OR AN APPROVED EGUAL.

UTILITIES

COORDINATE THE REQUIREMENTS FOR PROTECTION AND/OR RELOCATION OF UTILITIES WITH THE UTILITY OWNER PRIOR TO STARTING WORK.

VERIFY AND LOCATE ALL EXISTING UTILITIES PRIOR TO STARTING WORK; CONDUCT OPERATIONS IN A MANNER WHICH ENSURES THAT THE UTILITIES WILL NOT BE DISTURBED OR ENDANGERED, AND ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE TO UTILITIES DURING CONSTRUCTION. THE DEPARTMENT DOES NOT ASSUME RESPONSIBILITY FOR REIMBURSEMENT, PARTICIPATION IN DESIGN AND/OR REVISIONS, OR LIABILITY FOR ACCURACY OF TYPE, SIZE, AND LOCATION OF ANY UTILITY.

TIMBER

USE ONLY GLUE LAMINATED TIMBER FABRICATED WITH EITHER SOUTHERN PINE, RED MAPLE OR DOUGLAS FIR LUMBER GRADED PER NORTHEASTERN LUMBER MANUFACTURER'S ASSOCIATION (RED MAPLE) WESTERN WOOD PRODUCTS ASSOCIATION (DOUGLAS FIR) OR SOUTHERN PINE INSPECTION BUREAU (SOUTHERN PINE) STANDARDS AND MANUFACTURED FOLLOWING AITC 119, AITC 117 OR CURRENT SPECIFICATIONS.

PROVIDE MINIMUM WET-USE BASE RESISTANCES AND MOE VALUES IN ACCORDANCE WITH SHEET 2 OF 100M. USE GRADE NO. 2 OR BETTER FOR SOLID SAWN LUMBER.

ALL SAWN LUMBER SHALL BE TREATED IN ACCORDANCE WITH THE REQUIREMENTS OF AWPA STANDARD C14 WITH ONE OF THE FOLLOWING PRESERVATIVES:

A. CREOSOTE CONFORMING TO AWPA STANDARD P1
B. PENTACHLOROPHENOL CONFORMING TO AWPA STANDARD P8 IN HYDROCARBON SOLVENT, TYPE A, CONFORMING TO AWPA STANDARD P9
C. CCA CONFORMING TO AWPA STANDARD P5

GLULAM SHALL BE TREATED TO THE ABOVE REQUIREMENTS WITH CREOSOTE OR PENTACHLOROPHENOL.

TREATED MATERIAL SHALL BE FREE OF EXCESS PRESERVATIVES ON THE WOODS SURFACE. THE TREATING PROCESS FOR THESE PRESERVATIVES SHALL INCLUDE AN EXPANSION BATH, STEAMING AND/OR DRIPPING TO ENSURE THAT THE PRESERVATIVE WILL NOT BLEED.

TREATED WOOD SHALL BE INSPECTED AND CERTIFIED IN ACCORDANCE WITH AWPA STANDARD M2.

TREAT ALL ABRASIONS AND CUTS MADE IN THE FIELD WITH THREE BRUSH COATS OF THE FIELD TREATMENT SOLUTION.

FIELD CUTTING IS NOT PERMITTED UNLESS APPROVED BY THE ENGINEER.

WHEN FIELD CUTTING, TREAT WITH BITUMINOUS ASPHALT BASED ROOF CEMENT, COPPER NAPHTHENATE PASTE, OR APPROVED PRESERVATIVE SYSTEM.

PROVIDE PILOT HOLES FOR LAG SCREWS IN RANGE OF (0.60)D TO (0.70)D

LEAD HOLES FOR LAG SCREWS WITH D< 12.7mm ARE D+ 0.8mm

LEAD HOLES FOR LAG SCREWS WITH D> 12.7mm ARE D+ 1.6mm

ALWAYS COAT LAG SCREW THREADS WITH BITUMINOUS ASPHALT BASED ROOF CEMENT, COPPER NAPHTHENATE PASTE, OR APPROVED PRESERVATIVE SYSTEM BEFORE INSTALLING LAG SCREW.

DO NOT DRIVE LAG SCREW WITH HAMMER. SCREW OR TORQUE LAG SCREWS.

PROVIDE SUFFICIENT LAG SCREW LENGTH SO LAG SCREW SHANK WILL PENETRATE RECEIVING MEMBER.

SUBMIT SHOP DRAWINGS SHOWING DETAILS OF ALL GLULAM CONSTRUCTION FOR APPROVAL TO THE ENGINEER PRIOR TO FABRICATION OPERATIONS.

ALL TIMBER DIMENSIONS SHOWN ARE ACTUAL UNLESS OTHERWISE NOTED.

~~PILES~~

~~DO NOT PERMIT SPLICES IN PILES.~~

~~PROVIDE PILES IN ACCORDANCE WITH SHEET 2 OF 100M.~~

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

GENERAL NOTES

PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

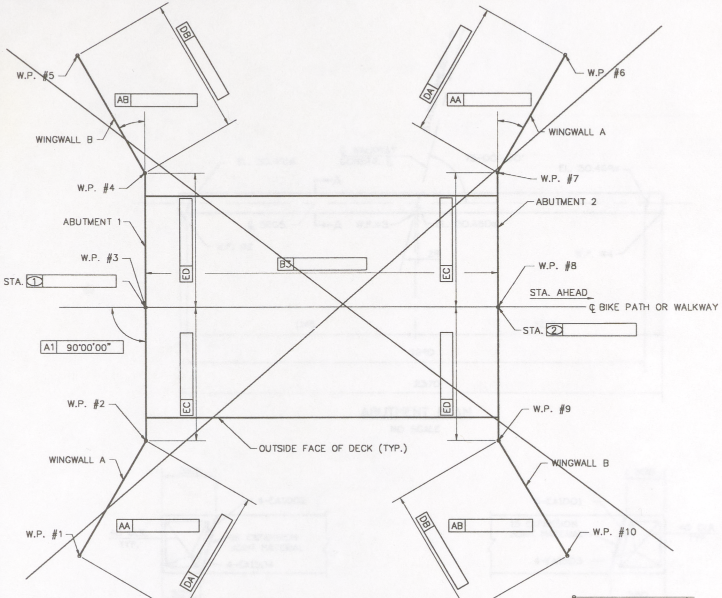
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
PATRICK SHAWN POWERS
ENGINEER

ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 5 | GLULAM BEAM SUPERSTRUCTURE |

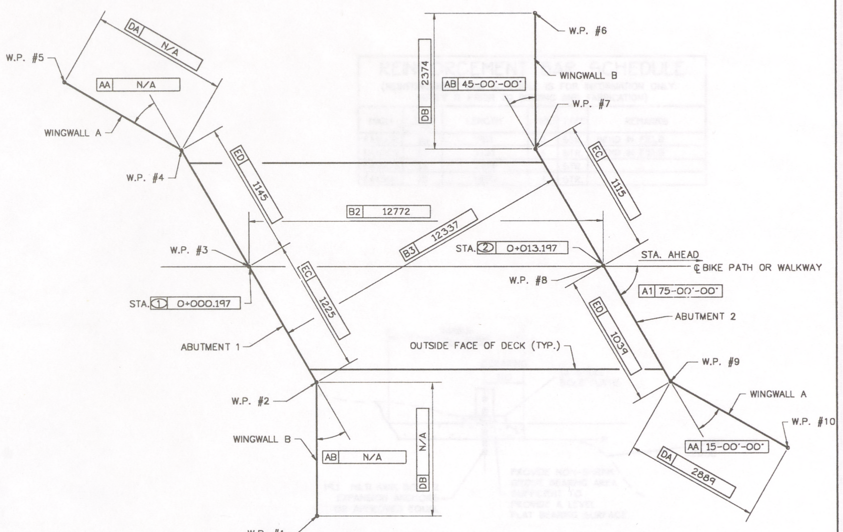
THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA



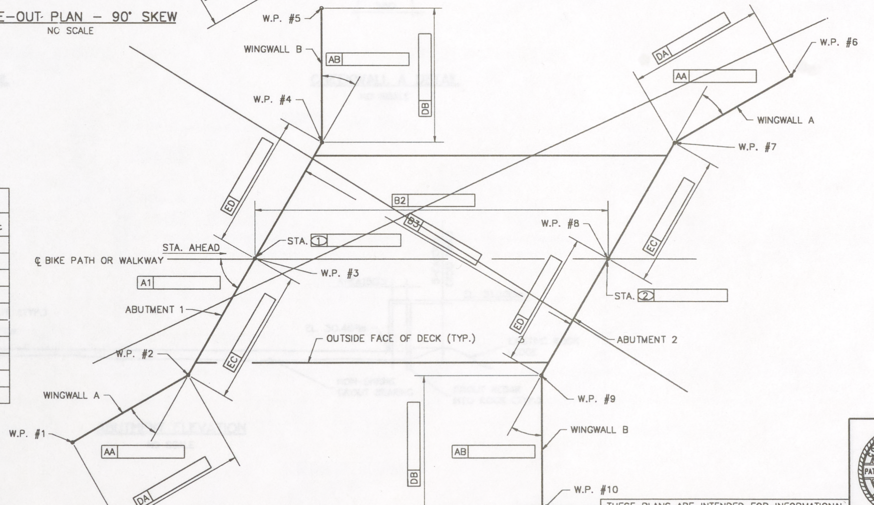

STAKE-OUT PLAN – 90° SKEW

NO SCALE




STAKE-OUT PLAN – RIGHT SKEW

NO SCALE




STAKE-OUT PLAN – LEFT SKEW

NO SCALE

| TABLE OF COORDINATES | | |
|---|---|---|
| W.P.# | NORTHING ~~(m)~~ft | EASTING ~~(m)~~ft |
| 1 | | |
| 2 | 49947.13 | 75011.17 |
| 3 | 49950.75 | 75010.19 |
| 4 | 49954.63 | 75009.15 |
| 5 | | |
| 6 | 49961.25 | 75056.59 |
| 7 | 49954.04 | 75052.42 |
| 8 | 49950.75 | 75053.30 |
| 9 | 49947.22 | 75054.25 |
| 10 | 49938.55 | 75059.26 |

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

REVISIONS

GLULAM BEAMS

STAKE OUT PLAN

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

PREPARED BY:
POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

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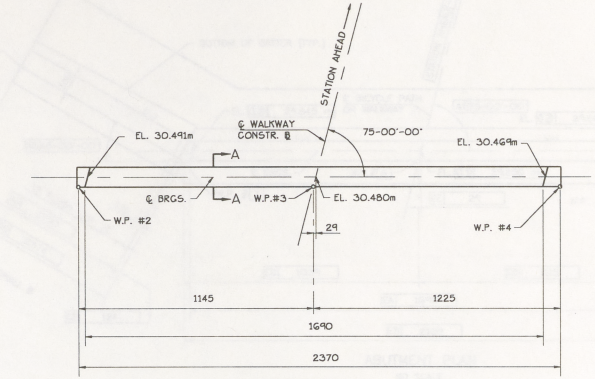
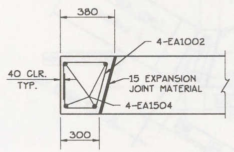
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
PATRICK SHAWN POWERS
ENGINEER

ENGINEER'S SEAL

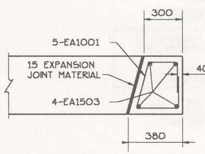
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 104M | 3 | SHT.'S COMMON TO 102M & 103M |




ABUTMENT PLAN
NO SCALE



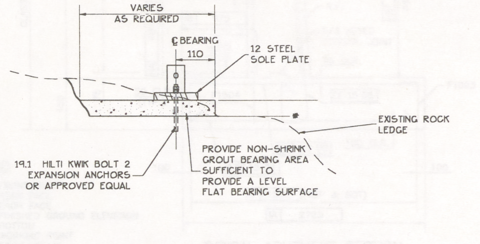

CHEEKWALL B DETAIL
NO SCALE




CHEEKWALL A DETAIL
NO SCALE

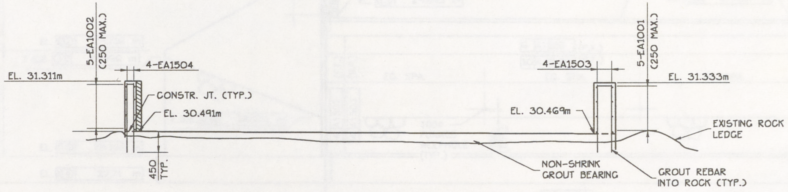
**REINFORCEMENT BAR SCHEDULE**
(REINFORCEMENT BAR SCHEDULE IS FOR INFORMATION ONLY. VERIFY IT PRIOR TO BIDDING AND FABRICATION)

| MARK | SIZE | LENGTH | NO. | TYPE | REMARKS |
|---|---|---|---|---|---|
| EA1001 | 10 | 981 | 5 | STR. | BEND IN FIELD |
| EA1002 | 10 | 1131 | 4 | STR. | BEND IN FIELD |
| EA1503 | 15 | 1314 | 5 | STR. | |
| EA1504 | 15 | 1270 | 4 | STR. | |




SECTION A-A
NO SCALE

* NOTE:
REMOVE EXISTING DEBRIS, ROCK AND OTHER MATERIAL DOWN TO BEARING ELEVATION OR LOWER AND CLEAN OR DRY SURFACE TO A CONDITION SATISFACTORY FOR PROPER ADHESION OF NON-SHRINK GROUT.




ABUTMENT ELEVATION
NO SCALE

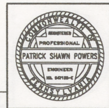
| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

ABUTMENT 1 PLAN + DETAILS

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA



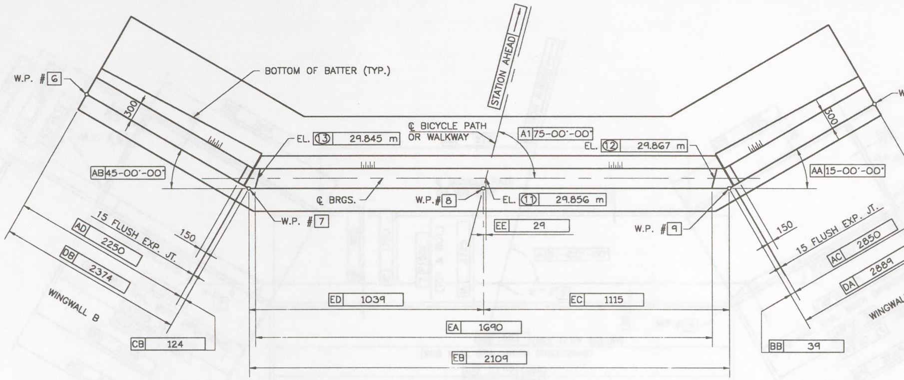

ENGINEER'S SEAL

| ISSUED: 4/9/98 | JOB: 97012 | SCALE: AS SHOWN |
|---|---|---|
| FILE: 97012 | DRAWN BY: JLV | CHECKED BY: PSP |

SHEET 6 of 21

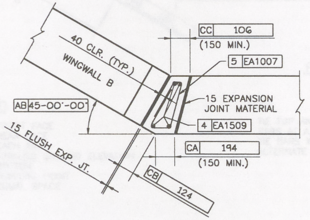
THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

PREPARED BY:
POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA



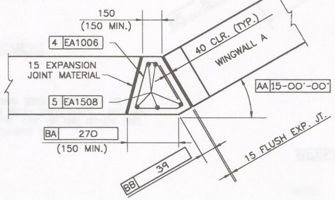

ABUTMENT PLAN

NO SCALE




CHEEKWALL B DETAIL

NO SCALE

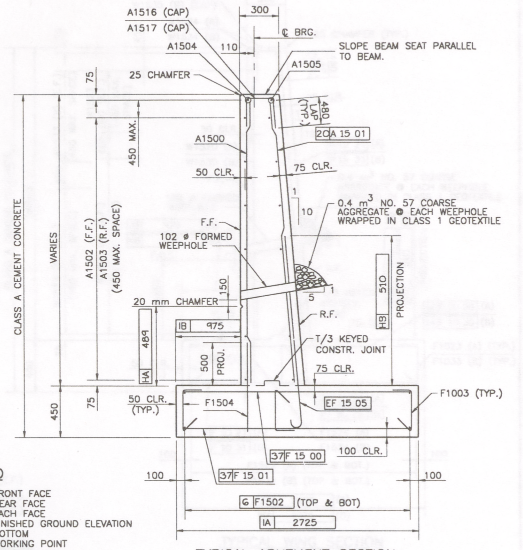



CHEEKWALL A DETAIL

NO SCALE

## LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

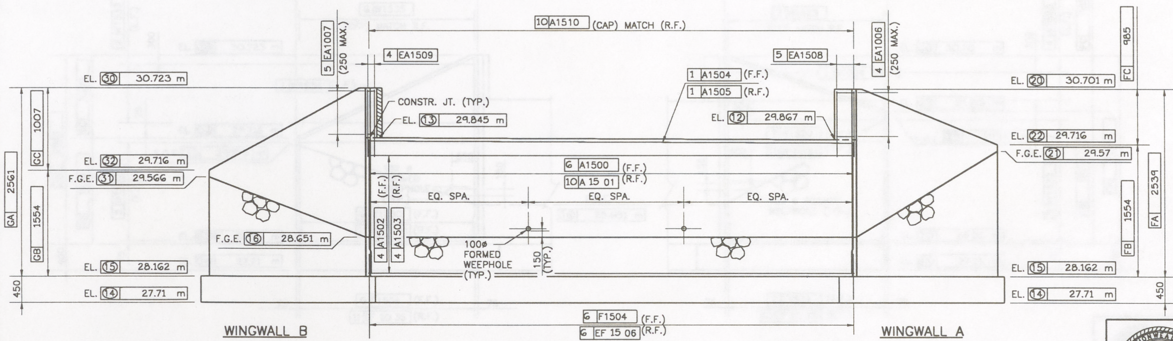



TYPICAL ABUTMENT SECTION

NO SCALE

## NOTES:

- FOR GENERAL NOTES, SEE SHEET 4
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET 5
- FOR ABUTMENT 2 FOOTING PLAN SEE SHEET 8
- FOR ABUTMENT 2 BAR SCHEDULE, SEE SHEET 9
- MAX. ALLOWABLE FOUNDATION PRESSURE = 0.50 MPa.
- MAX DESIGN FOUNDATION PRESSURE = 0.36 MPa.




ABUTMENT ELEVATION

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

PREPARED BY:

POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

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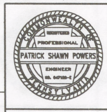


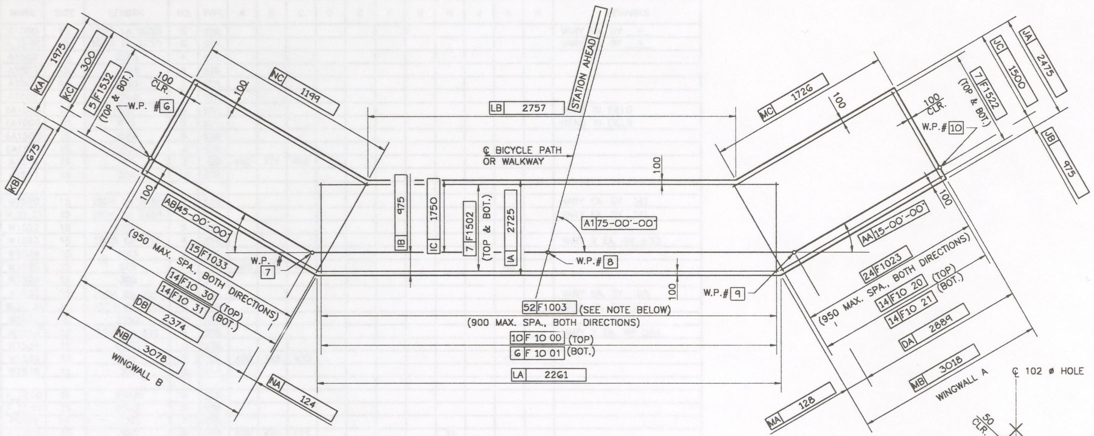

ENGINEER'S SEAL

ABUTMENT 2 – RIGHT SKEW

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 105M | 3 | SPREAD FOOTING ABUTMENT |




FOOTING PLAN – ABUTMENT

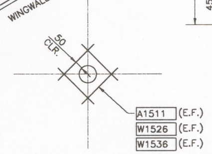
NO SCALE

LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

NOTE:

TIE TOP AND BOTTOM MATS OF REINFORCING STEEL WITH #10 TIE BARS AT A MAXIMUM SPACING OF 950 IN BOTH DIRECTIONS. PROVIDE TIE BARS WITH 90° HOOK AT ONE END AND 135° AT THE OTHER END. ALTERNATE 90° AND 135° AT TOP IN ALTERNATE TIES.

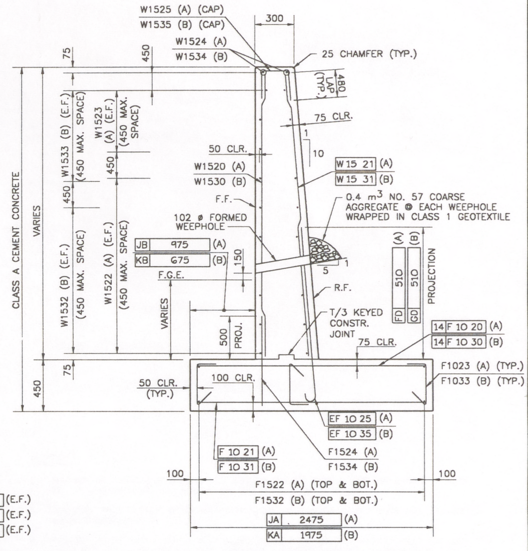



WEEPHOLE REINFORCEMENT DETAIL

NO SCALE

NOTE:

ADJUST REINFORCEMENT AS NECESSARY TO ACCOMMODATE OPENING.

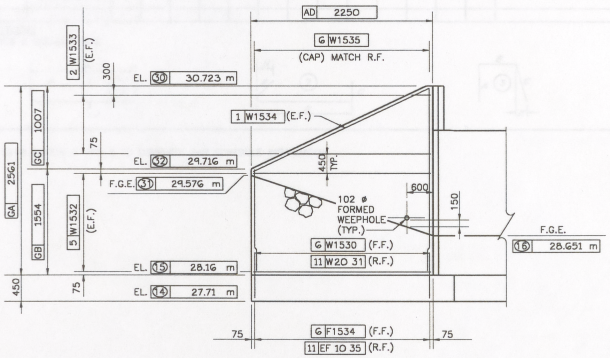



TYPICAL WING SECTION

NO SCALE

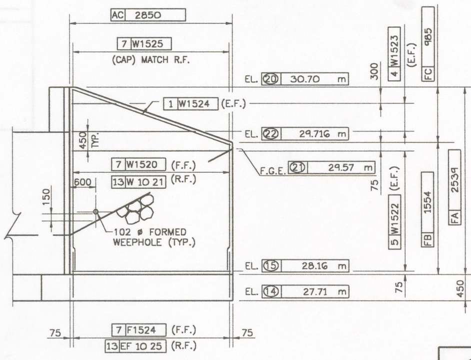
NOTES:

- FOR GENERAL NOTES, SEE SHEET 4
- FOR LOCATION OF WINGWALLS SEE STAKE-OUT SKETCH, SHEET 5
- FOR ABUTMENT 2, SEE SHEET 7
- FOR ABUTMENT 2 BAR SCHEDULE, SEE SHEET 9
- MAX. ALLOWABLE FOUNDATION PRESSURE = 0.50 MPa
- MAX DESIGN FOUNDATION PRESSURE = WING A OR C = 0.29 MPa; WING B OR D = 0.36 MPa




WINGWALL B

NO SCALE




WINGWALL A

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

ABUTMENT 2 – FTG. PLAN – RIGHT SKEW

PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK

FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

PREPARED BY:


POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA


THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL PATRICK SHAWN POWERS ENGINEER

ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 105M | 6 | SPREAD FOOTING ABUTMENT |

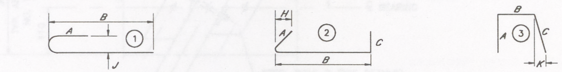
# REINFORCEMENT BAR SCHEDULE*

(REINFORCEMENT BAR SCHEDULE IS FOR INFORMATION ONLY. VERIFY IT PRIOR TO BIDDING AND FABRICATION)

| MARK | SIZE | LENGTH | NO. | TYPE | A | B | C | D | E | F | G | H | J | K | R | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1500 | 15 | 1655 to 1633 | 6 | STR. | | | | | | | | | | | | VARY EA. BY 4 |
| A 15 01 | 15 | 1655 to 1633 | 6 | STR. | | | | | | | | | | | | VARY EA. BY 4 |
| A1502 | 15 | 2153 | 4 | STR. | | | | | | | | | | | | |
| A1503 | 15 | 1963 | 4 | STR. | | | | | | | | | | | | |
| A1504 | 15 | 2153 | 1 | STR. | | | | | | | | | | | | |
| A1505 | 15 | 1963 | 1 | STR. | | | | | | | | | | | | |
| EA1006 | 10 | 950 | 4 | STR. | | | | | | | | | | | | BEND IN FIELD |
| EA1007 | 10 | 875 | 5 | STR. | | | | | | | | | | | | BEND IN FIELD |
| EA1508 | 15 | 1584 | 5 | STR. | | | | | | | | | | | | |
| EA1509 | 15 | 1328 | 4 | STR. | | | | | | | | | | | | |
| A1510 | 15 | 950 | 3 | 3 | 400 | 175 | 400 | | | | | | | 40 | | |
| A1511 | 15 | 300 | 16 | STR. | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| W1520 | 15 | 1504 to 2489 | 7 | STR. | | | | | | | | | | | | VARY EA. BY 141 |
| W 15 21 | 15 | 1504 to 2489 | 7 | STR. | | | | | | | | | | | | VARY EA. BY 141 |
| W1522 | 15 | 2750 | 5 | STR. | | | | | | | | | | | | |
| W1523 | 15 | 1703 to 838 | 4 | STR. | | | | | | | | | | | | VARY 2 EA. BY 433 |
| W1524 | 15 | 2915 | 2 | STR. | | | | | | | | | | | | |
| W1525 | 15 | 975 | 4 | 3 | 400 | 175 | 400 | | | | | | | 40 | | |
| W1526 | 15 | 300 | 8 | STR. | | | | | | | | | | | | |
| W1530 | 15 | 1504 to 2511 | 23 | STR. | | | | | | | | | | | | VARY EA. BY 168 |
| W 20 31 | 20 | 1504 to 2511 | 6 | STR. | | | | | | | | | | | | VARY EA. BY 168 |
| W1532 | 15 | 2150 | 10 | STR. | | | | | | | | | | | | |
| W1533 | 15 | 1349 to 641 | 4 | STR. | | | | | | | | | | | | VARY 2 EA. BY 354 |
| W1534 | 15 | 2365 | 2 | STR. | | | | | | | | | | | | |
| W1535 | 15 | 975 | 3 | 3 | 400 | 325 | 400 | | | | | | | 40 | | |
| W1536 | 15 | 300 | 8 | STR. | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| F 15 00 | 15 | 2525 | 6 | STR. | | | | | | | | | | | | |
| F 15 01 | 15 | 2525 | 6 | STR. | | | | | | | | | | | | |
| F1502 | 15 | 2061 | 7 | STR. | | | | | | | | | | | | |
| F1003 | 10 | 550 | 16 | 2 | 125 | 450 | 125 | | | | | 75 | | | | |
| F1504 | 15 | 900 | 6 | STR. | | | | | | | | | | | | |
| EF 15 06 | 15 | 1040 | 6 | 1 | 280 | 1100 | | | | | | | 200 | | | |
| F 15 20 | 15 | 2275 | 8 | STR. | | | | | | | | | | | | |
| F 15 21 | 15 | 2275 | 8 | STR. | | | | | | | | | | | | |
| F1522 | 15 | 2818 | 7 | STR. | | | | | | | | | | | | |
| F1023 | 10 | 700 | 20 | 2 | 125 | 450 | 125 | | | | | 75 | | | | |
| F1524 | 15 | 900 | 7 | STR. | | | | | | | | | | | | |
| EF 15 25 | 15 | 1040 | 13 | 1 | 280 | 1020 | | | | | | | 200 | | | |
| F 20 30 | 20 | 1775 | 8 | STR. | | | | | | | | | | | | |
| F 15 31 | 15 | 1775 | 8 | STR. | | | | | | | | | | | | |
| F1532 | 15 | 2878 | 5 | STR. | | | | | | | | | | | | |
| F1033 | 10 | 700 | 15 | 2 | 125 | 450 | 125 | | | | | 75 | | | | |
| F1534 | 15 | 900 | 6 | STR. | | | | | | | | | | | | |
| EF 15 35 | 15 | 1040 | 6 | 1 | 180 | 1780 | | | | | | | 130 | | | |

BAR TYPE LEGEND

STR. DENOTES A STRAIGHT BAR




*USE 101M SHEETS 7 AND 8 TO COMPLETE BAR SCHEDULE INFORMATION.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| REVISIONS | | | | | |

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PATRICK SHAWN POWERS

ENGINEER'S SEAL

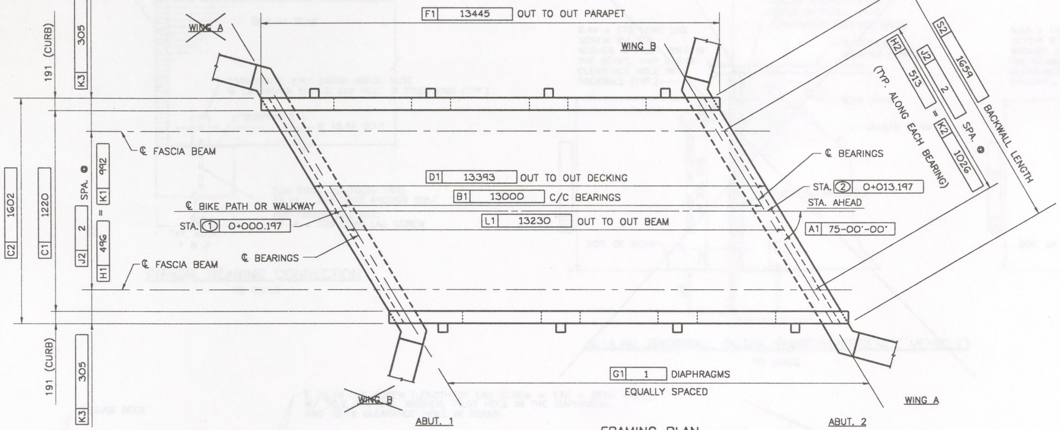
ABUTMENT 2 BAR SCHEDULE

PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

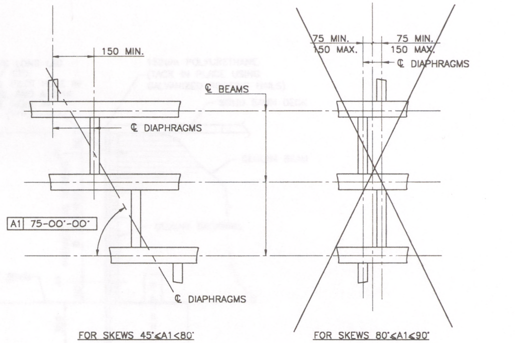
RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 105M | 7 | SPREAD FOOTING ABUTMENT |

SHEET 9 of 21

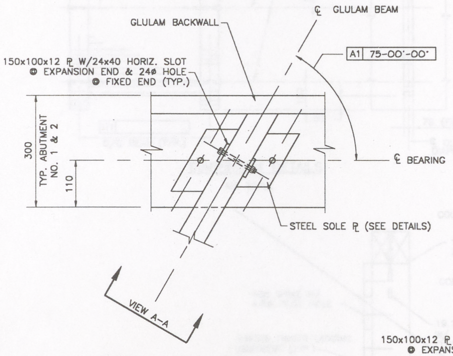



## FRAMING PLAN
NO SCALE

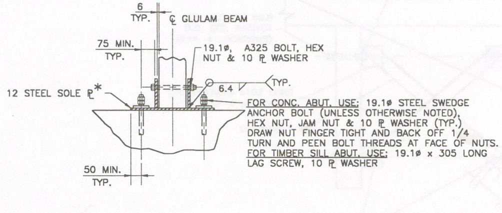



## DIAPHRAGM PLACEMENT DETAIL
NO SCALE

NOTE:
REFER TO 102M SHEET 9 FOR SUPERSTRUCTURE DETAILS

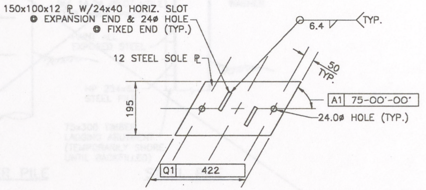



## BEARING PLATE DETAIL
NO SCALE




## VIEW A–A
NO SCALE

* SLOPE BEAM SEAT PARALLEL TO BOTTOM OF BEAM




## BEARING PLATE DETAIL
NO SCALE

## NOTES:

1. PROVIDE MECHANICALLY GALVANIZED SWEDGE OR APPROVED TYPE OF ANCHOR BOLTS. SET IN THE MASONRY AS SHOWN ON THE DESIGN DRAWINGS.
2. PROVIDE MINIMUM SIZE WELD IN ACCORDANCE WITH AASHTO/AWS CODE UNLESS LARGER WELD IS REQUIRED BY DESIGN.
3. PROVIDE PLATE WASHERS OF SUFFICIENT SIZE TO COVER THE ROUND HOLE OR SLOT FOR EXTREMES OF MOVEMENT OF THE BEARINGS. WASHER MAY BE CLIPPED IF REQUIRED.
4. FILL ANCHOR BOLT OR LAG SCREW SOLE PLATE HOLES WITH NON-HARDENING CAULKING COMPOUND.
5. PERMIT DRILLING OF ANCHOR BOLT HOLES AT ABUTMENT ONLY. WASH AND DRY HOLE BEFORE FILLING WITH NON-SHRINK GROUT.
6. BLAST CLEAN CONCRETE BEARING SURFACES TO ACHIEVE ROUGH TEXTURE IF REQUIRED.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

FRAMING PLAN – RIGHT SKEW

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER PATRICK SHAWN POWERS

ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 8 | GLULAM BEAM SUPERSTRUCTURE |

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PREPARED BY:
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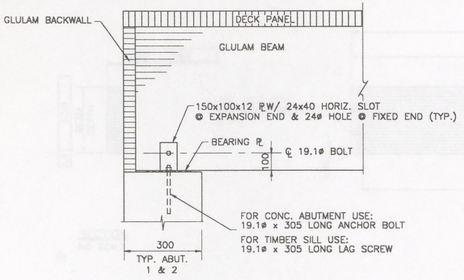
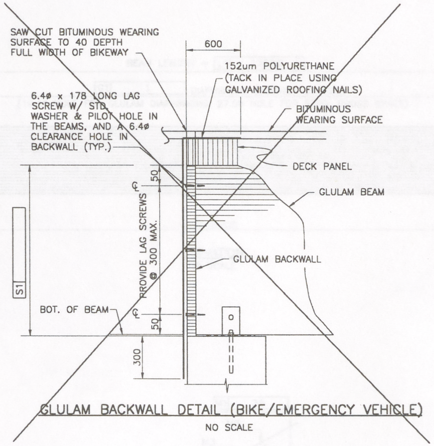
STATE COLLEGE, PA



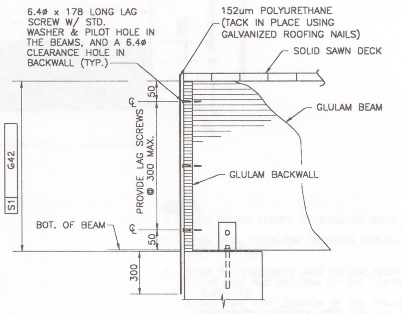

TYPICAL BEARING CONNECTION

NO SCALE



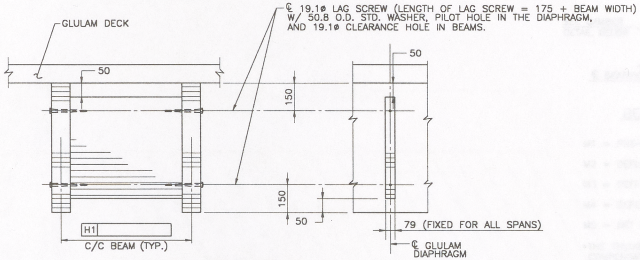

GLULAM BACKWALL DETAIL (BIKE/EMERGENCY VEHICLE)

NO SCALE



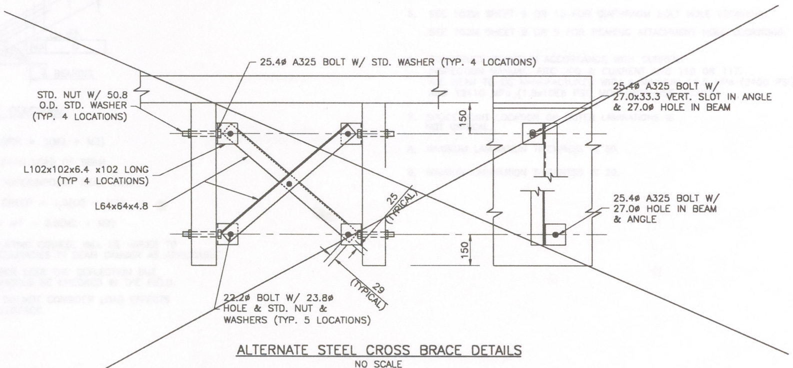

GLULAM BACKWALL DETAIL (PEDESTRIAN)

NO SCALE




DIAPHRAGM DETAILS

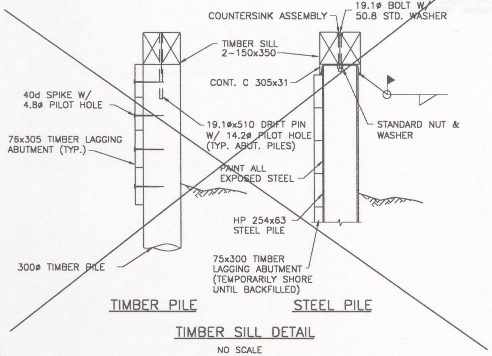
NO SCALE




ALTERNATE STEEL CROSS BRACE DETAILS

NO SCALE

(L4 < 1400)




TIMBER SILL DETAIL

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

SUPERSTRUCTURE DETAILS

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK

FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

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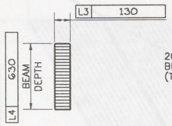
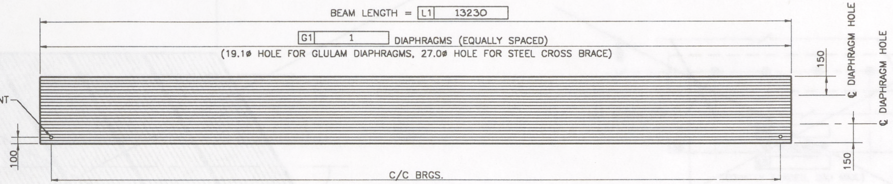
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER PATRICK SHAWN POWERS

ENGINEER'S SEAL

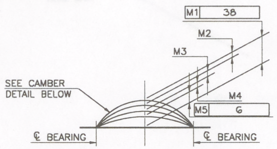
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 9 | GLULAM BEAM SUPERSTRUCTURE |




SECTION
NO SCALE




ELEVATION
NO SCALE




BEAM CAMBER DIAGRAM

M1 = PRE-FABRICATED CAMBER = 3(M2 + M3)

M2 = DEFLECTION DUE TO DEAD LOAD OF BEAM

M3 = DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD

M4 = DEFLECTION DUE TO CREEP = 1.5(M2 + M3)

M5 = NET FINAL CAMBER = M1 − 2.5(M2 + M3)

- THE THICKNESS OF THE WEARING COURSE WILL BE VARIED TO COMPENSATE FOR ANY INACCURACIES IN BEAM CAMBER AS APPLICABLE.
- THE PRE-FABRICATED CAMBER LESS THE DEFLECTION DUE TO DEAD LOAD OF BEAM SHOULD BE CHECKED IN THE FIELD.
- DEFLECTION CALCULATIONS DO NOT CONSIDER LOAD EFFECTS DUE TO FUTURE WEARING SURFACE.

NOTES:

1. SHOW DESIGN LENGTH OF BEAM ON SHOP DRAWINGS.
2. SHOW PLAN, ELEVATION, SECTIONS AND ALL DETAILS ON SHOP DRAWINGS.
3. SHOW THE FOLLOWING DATA ON THE SHOP DRAWINGS:
   1. THE SIZE AND LOCATION OF THE TEMPORARY STORAGE SUPPORTS.
   2. THE TYPE AND LOCATION OF THE BRACING AND TEMPORARY SUPPORTS USED FOR THE TRANSPORTATION OF THE BEAMS.
4. FABRICATOR CHECKS STABILITY FOR HANDLING AND TRANSPORTING OF THE MEMBERS.
5. SEE 102M SHEET 9 OR 10 FOR DIAPHRAGM BOLT HOLE LOCATIONS.
   SEE 102M SHEET 8 OR 9 FOR BEARING ATTACHMENT HOLE LOCATIONS.
6. CONSTRUCT BEAMS IN ACCORDANCE WITH CURRENT INSPECTION MANUAL, AITC 200 & CURRENT AITC 119 OR 117. ALL BEAM TO BE MANUFACTURED WITH A MINIMUM 16.5 MPa (2400 PSI) $F_b$ AND 12410 MPa (1.8x10E6 PSI) MOE (DRY-USE VALUES).
7. SPLICE JOINT LOCATION ON OUTER LAMINATIONS IS NOT CRITICAL.
8. MAXIMUM LAMINATION THICKNESS IS 50.
9. MINIMUM LAMINATIION THICKNESS IS 20.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

BEAM DETAILS

PROPOSED PEDESTRIAN BRIDGE
OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA


ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 10 | GLULAM BEAM SUPERSTRUCTURE |

SHEET 12 of 21

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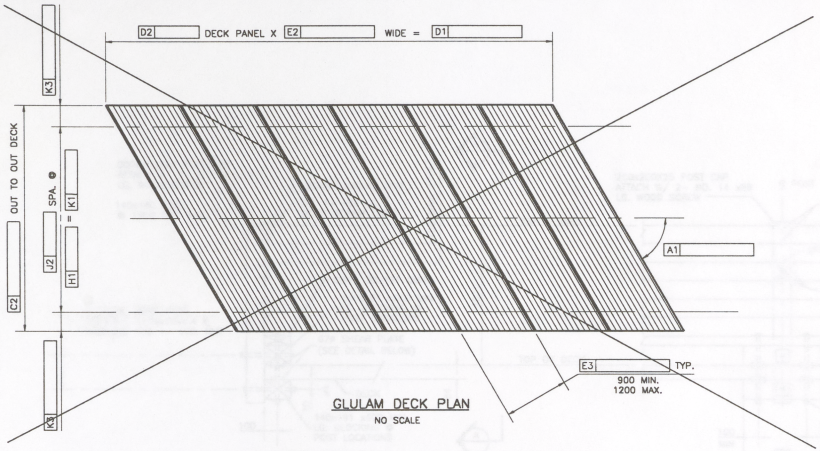
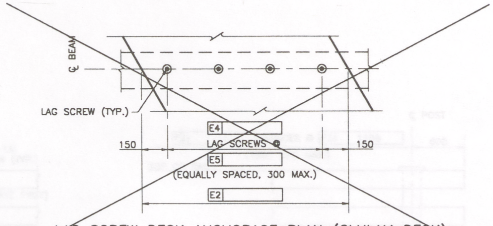
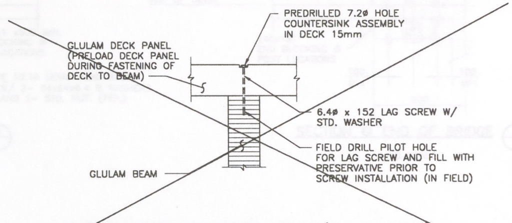


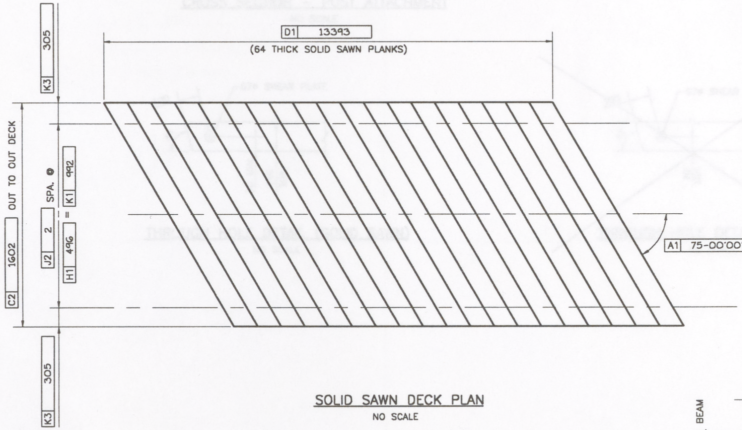

GLULAM DECK PLAN
NO SCALE



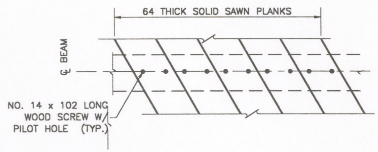

LAG SCREW DECK ANCHORAGE PLAN (GLULAM DECK)
NO SCALE




LAG SCREW DECK ANCHORAGE DETAIL (GLULAM DECK)
NO SCALE




SOLID SAWN DECK PLAN
NO SCALE




LAG SCREW DECK ANCHORAGE PLAN (SOLID SAWN DECK)
NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

DECK PLAN – RIGHT SKEW

PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 13 | GLULAM BEAM SUPERSTRUCTURE |

SHEET 13 of 21

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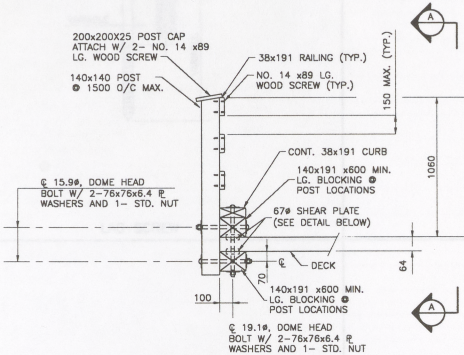
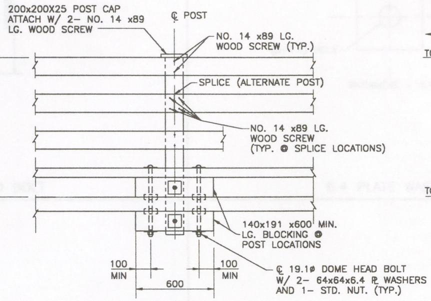
PATRICK SHAWN POWERS
ENGINEER'S SEAL



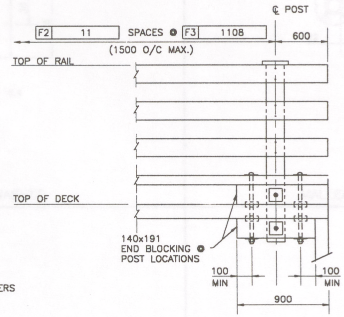

CROSS SECTION – POST ATTACHMENT

NO SCALE



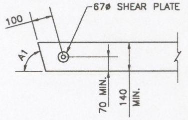

SECTION @ INTERIOR POST (A)

NO SCALE



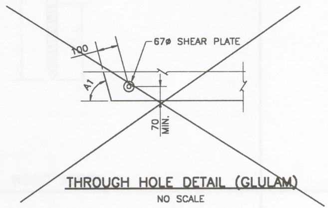

SECTION @ END OF BRIDGE (A)

NO SCALE




THROUGH HOLE DETAIL (SOLID SAWN)

NO SCALE




THROUGH HOLE DETAIL (GLULAM)

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

REVISIONS

PEDESTRIAN BRIDGE RAIL DETAILS

PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

ENGINEER'S SEAL: PATRICK SHAWN POWERS, REGISTERED PROFESSIONAL ENGINEER

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 104M | 1 | SHT.'S COMMON TO 102M & 103M |

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STATE COLLEGE, PA

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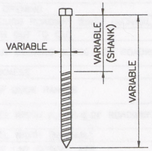
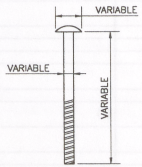
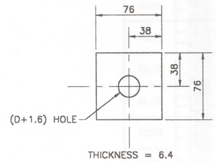


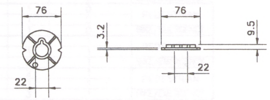

LAG SCREW



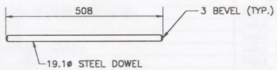

DOME HEAD BOLT



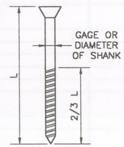

6.4 PLATE WASHER




MALLEABLE IRON WASHER




DRIFT PIN




WOOD SCREW

NOTE:

STANDARD BOLTS, NUTS, AND WASHER NOT SHOWN.

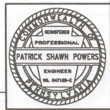
| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

REVISIONS

TYPICAL HARDWARE DETAILS

PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA




ENGINEER'S SEAL

THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 104M | 4 | SHT.'S COMMON TO 102M &103M |

PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

## CONTROL DIMENSIONS

| CODE | DESCRIPTION | | SOURCE | | VALUE |
|---|---|---|---|---|---|
| A1 | SKEW ANGLE | | DESIGNER | | 75-00'-00" DEG. |
| A2 | % GRADE (LOOKING STATIONS AHEAD) | | DESIGNER | | -4.69% |
| B1 | SPAN LENGTH- ℄ TO ℄ BEARING | | DESIGNER | | 13000 |
| B2 | FRONT FACE TO FRONT FACE OF ABUTMENTS | | $\left(B1-\frac{220}{SIN(A1)}\right)$ | | 12772 |
| B3 | WATERWAY OPENING | | (B2)SIN(A1) | | 12337 |
| C1 | CURB TO CURB ROADWAY WIDTH (NORMAL) | | TABLE 1 | | 1220 |
| C2 | DECK WIDTH OUT TO OUT | | C1+382 | | 1602 |
| D1 | OUT TO OUT DECKING ALONG ℄ OF ROADWAY | | $B1+\frac{380}{SIN(A1)}$ | | 13393 |
| D2 | DECK THICKNESS | | TABLE 1 | | 64 |
| E1 | NUMBER OF DECK PANELS | COMPLETE FOR GLULAM DECK ONLY | $\left\{\frac{D1*SIN(A1)}{1200}\right\}$ | (1) | N/A |
| E2 | DECK PANEL WIDTH ALONG ℄ OF ROADWAY | | $\frac{D1}{E1}$ | | N/A |
| E3 | DECK PANEL WIDTH (NORMAL) | | E2*SIN(A1) | | N/A |
| E4 | NUMBER OF LAG SCREWS PER DECK PANEL PER BEAM | | $\left\{\frac{E2-300}{300}+1\right\}$ | (1) | N/A |
| E5 | LAG SCREW SPACING | | $\frac{E2-300}{E4-1}$ | | N/A |
| F1 | OUT TO OUT PARAPET LENGTH | | $D1+\frac{191}{TAN(A1)}$ | | 13445 |
| F2 | NUMBER OF GUIDE RAIL TIMBER POST SPACES | | $\left\{\frac{D1-1200}{1200}\right\}$ | (1) | 11 |
| F3 | GUIDE RAIL POST SPACING | | $\frac{D1-1200}{F2}$ | | 1108 |
| G1 | NUMBER OF DIAPHRAGMS | | TABLE 1 | | 1 |
| H1 | BEAM SPACING (NORMAL) | | TABLE 1 | | 496 |
| H2 | BEAM SPACING ALONG SKEW | | $\frac{H1}{SIN(A1)}$ | | 513 |
| J1 | NUMBER OF BEAMS | | TABLE 1 | | 3 |
| J2 | NUMBER OF BEAM SPACES | | J1-1 | | 2 |
| K1 | ℄ FASCIA TO ℄ FASCIA BEAM | | H1*J2 | | 992 |
| K2 | ℄ FASCIA TO ℄ FASCIA BEAM ALONG SKEW | | H2*J2 | | 1027 |
| K3 | ℄ FASCIA BEAM TO OUTSIDE FACE OF DECK | | $\frac{1}{2}(C2-K1)$ | | 305 |
| L1 | BEAM LENGTH (OUT TO OUT OF BEAM) | | $B1+\frac{222}{SIN(A1)}$ | | 13230 |
| L2 | GLULAM BEAM SPECIES COMBINATION | | DESIGNER | (5) | RED MAPLE |
| L3 | BEAM WIDTH | | TABLE 1 | | 130 |
| L4 | BEAM DEPTH | | TABLE 1 | | 630 |
| M1 | PRE-FABRICATED CAMBER | | TABLE 1 | | 38 |
| M5 | NET FINAL CAMBER | | TABLE 1 | | 6 |
| Q1 | BEARING PLATE WIDTH | | $\frac{L3+36}{SIN(A1)}+250$ | | 422 |
| S1 | BACKWALL DEPTH | | L4+12 | | 642 |
| S2 | BACKWALL LENGTH | CONCRETE ABUTMENTS | $\frac{C2}{SIN(A1)}$ | | 1659 |
| | | TIMBER SILL ABUTMENTS | $\frac{C2}{SIN(A1)}+\frac{76}{SIN(AA)}+\frac{76}{SIN(AB)}+200$ | (2) | N/A |

## CONTROL STATIONS AND ELEVATIONS

| CODE | LOCATION | SOURCE | VALUE (m) | |
|---|---|---|---|---|
| | | | STATION | P.G. ELEV. |
| 1 | ℄ BICYCLE PATH OR WALKWAY AT ℄ BRG. ABUT.1 | DESIGNER | 0+000.197 | 31.172 |
| 2 | ℄ BICYCLE PATH OR WALKWAY AT ℄ BRG. ABUT.2 | DESIGNER | 0.+013.197 | 30.562 |
| 3 | ℄ BICYCLE PATH OR WALKWAY AT BEGIN OF STR. | STA 1 $-\frac{190}{SIN(A1)}\left(\frac{m}{1*10^3 mm}\right)$ | 0+000.00 | ------- |
| 4 | ℄ BICYCLE PATH OR WALKWAY AT END OF STR. | STA 2 $+\frac{190}{SIN(A1)}\left(\frac{m}{1*10^3 mm}\right)$ | 0+013.394 | ------- |

## TABLE 1 – DESIGN DATA (3,4,5)

| SPAN (B1) mm | CURB TO CURB (C1) mm | DECK THICK. (E1) mm | BEAM SPA. (H1) mm | NO. OF BEAMS (J1) # | BEAM WIDTH (L3) mm | BEAM DEPTH (L4) mm | PRE-FABRICATED CAMBER (M1) mm | NET FINAL CAMBER (M5) mm | NO. OF DIAPHRAGMS (G1) # | BRIDGE TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| 3000 | 1220 | 64 | 496 | 3 | 79 | 175 | 3 | 1 | 0 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 210 | 3 | 0 | 0 | |
| | 3600 | 79 | 1020 | 4 | 79 | 315 | 4 | 1 | 0 | BIKE/EMERGENCY |
| 4000 | 1220 | 64 | 496 | 3 | 79 | 245 | 5 | 1 | 0 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 280 | 4 | 1 | 0 | |
| | 3600 | 79 | 1020 | 4 | 79 | 385 | 8 | 1 | 0 | BIKE/EMERGENCY |
| 5000 | 1220 | 64 | 496 | 3 | 79 | 280 | 8 | 1 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 315 | 7 | 1 | 1 | |
| | 3600 | 79 | 1020 | 4 | 79 | 455 | 12 | 2 | 1 | BIKE/EMERGENCY |
| 6000 | 1220 | 64 | 496 | 3 | 79 | 350 | 9 | 2 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 385 | 9 | 1 | 1 | |
| | 3600 | 79 | 1020 | 4 | 79 | 455 | 20 | 3 | 1 | BIKE/EMERGENCY |
| 7000 | 1220 | 64 | 496 | 3 | 79 | 385 | 13 | 2 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 455 | 11 | 2 | 1 | |
| | 3600 | 79 | 1020 | 4 | 79 | 560 | 25 | 4 | 1 | BIKE/EMERGENCY |
| 8000 | 1220 | 64 | 496 | 3 | 79 | 455 | 15 | 2 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 490 | 15 | 3 | 1 | |
| | 3600 | 79 | 1020 | 4 | 79 | 595 | 36 | 6 | 1 | BIKE/EMERGENCY |
| 9000 | 1220 | 64 | 496 | 3 | 79 | 525 | 17 | 3 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 560 | 17 | 3 | 2 | |
| | 3600 | 79 | 1020 | 4 | 79 | 665 | 41 | 7 | 1 | BIKE/EMERGENCY |
| 10000 | 1220 | 64 | 496 | 3 | 79 | 560 | 22 | 4 | 2 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 630 | 19 | 3 | 2 | |
| | 3600 | 79 | 1020 | 4 | 79 | 735 | 47 | 8 | 2 | BIKE/EMERGENCY |
| 11000 | 1220 | 64 | 496 | 3 | 79 | 630 | 24 | 4 | 2 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 595 | 26 | 4 | 1 | |
| | 3600 | 79 | 1020 | 4 | 130 | 630 | 70 | 12 | 1 | BIKE/EMERGENCY |
| 12000 | 1220 | 64 | 496 | 3 | 130 | 560 | 36 | 6 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 630 | 32 | 5 | 1 | |
| | 3600 | 79 | 1020 | 4 | 130 | 770 | 74 | 12 | 1 | BIKE/EMERGENCY |
| 13000 | 1220 | 64 | 496 | 3 | 130 | 630 | 38 | 6 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 700 | 34 | 6 | 1 | |
| | 3600 | 79 | 1020 | 4 | 130 | 735 | 90 | 15 | 1 | BIKE/EMERGENCY |
| 14000 | 1220 | 64 | 496 | 3 | 130 | 665 | 46 | 8 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 735 | 41 | 7 | 1 | |
| | 3600 | 79 | 1020 | 4 | 130 | 805 | 94 | 16 | 1 | BIKE/EMERGENCY |
| 15000 | 1220 | 64 | 496 | 3 | 130 | 700 | 53 | 9 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 805 | 44 | 7 | 1 | |
| | 3600 | 79 | 1020 | 4 | 130 | 875 | 98 | 16 | 1 | BIKE/EMERGENCY |
| 16000 | 1220 | 64 | 496 | 3 | 130 | 770 | 56 | 9 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 840 | 51 | 8 | 2 | |
| | 3600 | 79 | 1020 | 4 | 130 | 910 | 114 | 19 | 2 | BIKE/EMERGENCY |
| 17000 | 1220 | 64 | 496 | 3 | 130 | 805 | 64 | 11 | 2 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 910 | 54 | 9 | 2 | |
| | 3600 | 79 | 1020 | 4 | 130 | 980 | 119 | 20 | 2 | BIKE/EMERGENCY |
| 18000 | 1220 | 64 | 496 | 3 | 130 | 840 | 73 | 12 | 2 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 945 | 62 | 10 | 2 | |
| | 3600 | 79 | 1020 | 4 | 130 | 1050 | 124 | 21 | 2 | BIKE/EMERGENCY |

FOOTNOTES FOR TABLES

(1) ROUND TO THE NEXT WHOLE NUMBER – ONLY WITHIN { }

(2) SEE SHEET 11 OF 101M FOR VARIABLES "AA" AND "AB"

(3) BEAMS DESIGNED WITH APPROPRIATE WET USE & SIZE FACTOR.

(4) DESIGN TABLE DO NOT ACCOUNT FOR VERTICAL OR HORIZONTAL CURVES ON BRIDGE DECK.

(5) USE EITHER DOUGLAS FIR, RED MAPLE, OR SOUTHERN PINE AS PER SHEET 2 OF 100M.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

GLULAM BEAM

PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 1 | DATA ASSEMBLY SHEETS |

PREPARED BY:
POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

## QUANTITIES FOR PEDESTRIAN BRIDGE SUPERSTRUCTURE

| ITEM | | QUANTITY FORMULA | UNIT | SUBTOTAL | TOTAL |
|---|---|---|---|---|---|
| GLUE LAMINATED TIMBER BEAMS | | $J1{*}L1{*}L3{*}L4\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | 3.25 | 3.25 |
| DECK | SOLID SAWN | $C2{*}D1{*}D2\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | 1.37 | 3.64 |
| RAILING POST | SOLID SAWN | $2\left((F2+1)(140{*}140)(1200+D2)\right)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | 0.59 | |
| RAILING | SOLID SAWN | $2\left(3(F1)(191)(38)\right)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | 0.59 | |
| CURB | SOLID SAWN | $2(F1)(50)(191)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | 0.26 | |
| BLOCKING | SOLID SAWN | $2\left(2(F2-1)(600)(140)(191)+4(900)(140)(191)\right)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | 0.83 | |
| BACKWALL | GLUE LAMINATED TIMBER | $2(S2)(79)(S1)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | 0.17 | 0.20 |
| DIAPHRAGMS | GLUE LAMINATED TIMBER | $(G1)J2(L4-100)79(H1-L3)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | 0.03 | |
| BEARING PLATE ASSEMBLIES | | $2(J1)\left((Q1)(195)(12)+2(150)(100)(12)\right)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)\left(7580\,\frac{kg}{m^3}\right)$ | kg | 63.45 | 63.45 |
| SELECT SURFACE TREATMENT | | $(THICKNESS)(C1)D1\left(\frac{m^3}{1{*}10^9\,mm^3}\right)2250\left(\frac{kg}{m^3}\right)$ | kg | N/A | N/A |
| 152um POLYURETHANE | | $2(S2)(S1+D2+300)\left(\frac{m^2}{1{*}10^6\,mm^2}\right)$ | $m^2$ | 3.34 | 3.34 |

FOOTNOTES FOR TABLE:

(1) THICKNESS IS DETERMINED BY DESIGNER (10 MAX.)

## QUANTITIES FOR BIKE/EMERGENCY VEHICLE BRIDGE SUPERSTRUCTURE

| ITEM | | QUANTITY FORMULA | UNIT | SUBTOTAL | TOTAL |
|---|---|---|---|---|---|
| GLUE LAMINATED TIMBER BEAMS | | $J1{*}L1{*}L3{*}L4\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | | |
| DECK | GLUE LAMINATED TIMBER | $C2{*}E1{*}E2{*}D2\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | | |
| BACKWALL | GLUE LAMINATED TIMBER | $2(S3)(79)\left(\frac{S1+S2}{2}\right)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | | |
| DIAPHRAGMS | GLUE LAMINATED TIMBER | $(G1)J2(L4-100)79(H1-L3)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | | |
| RAILING POST | SOLID SAWN | $2\left((F2+1)(140{*}140)(1550+D2)\right)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | | |
| RAILING | SOLID SAWN | $2\left(4(F1)(191)(38)\right)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | | |
| CURB | SOLID SAWN | $2(F1)(50)(191)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | | |
| BLOCKING | SOLID SAWN | $2\left(2(F2)(600)(140)(191)+4(900)(140)(191)\right)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)$ | $m^3$ | | |
| BEARING PLATE ASSEMBLIES | | $2(J1)\left((Q1)(195)(12)+2(150)(100)(12)\right)\left(\frac{m^3}{1{*}10^9\,mm^3}\right)\left(7580\,\frac{kg}{m^3}\right)$ | kg | | |
| 152um POLYURETHANE | | $2(S2)(S1+D2+900)\left(\frac{m^2}{1{*}10^6\,mm^2}\right)$ | $m^2$ | | |
| WATERPROOF MEMBRANE | | $(D1)(C1)\left(\frac{m^2}{1{*}10^6\,mm^2}\right)$ | $m^2$ | | |
| BITUMINOUS WEARING COURSE | | $(40)(C1)D1\left(\frac{m^3}{1{*}10^9\,mm^3}\right)2250\left(\frac{kg}{m^3}\right)$ | kg | | |

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

PREPARED BY:

POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA



COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
PATRICK SHAWN POWERS
ENGINEER

ENGINEER'S SEAL

GLULAM BEAM

PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 2 | DATA ASSEMBLY SHEETS |

## CONTROL DIMENSIONS

| CODE | DESCRIPTION | SOURCE | | VALUE |
|---|---|---|---|---|
| A1 | SKEW ANGLE | A1 | (1) | 75-00'-00' DEG. |
| A2 | % GRADE (LOOKING STATIONS AHEAD) | A2 | (1) | -4.96% |
| C1 | CURB TO CURB ROADWAY WIDTH (NORMAL) | C1 | (1) | 1220 |
| C2 | DECK WIDTH OUT TO OUT | C2 | (1) | 1602 |
| D2 | DECK THICKNESS | D2 | (1) | 64 |
| A | BEAM DEPTH | USE L4 FOR GLULAM BEAM OR ZERO (0) FOR LONG. PANEL | (1) | 630 |
| B | BEARING THICKNESS | USE TWELVE (12) FOR GLULAM BEAM OR TWENTY (20) FOR LONG. PANEL | (1) | 12 |
| AA | WINGWALL "A" SKEW ANGLE | DESIGNER (15°00'00" MIN., 45°00'00" MAX.) | (4) | 15-00'-00' DEG. |
| AB | WINGWALL "B" SKEW ANGLE | DESIGNER (15°00'00" MIN., 45°00'00" MAX.) | (4) | 45-00'-00' DEG. |
| AC | WINGWALL "A" LENGTH | DESIGNER | (4) | 2850 |
| AD | WINGWALL "B" LENGTH | DESIGNER | (4) | 2250 |
| BA | CHEEKWALL "A" | $150+\left(\frac{300}{TAN(A1)}\right)+300\left(TAN\left(\frac{AA}{2}\right)\right)$ | | 270 |
| BB | CHEEKWALL "A" | $300\left(TAN\left(\frac{AA}{2}\right)\right)$ | | 39 |
| CA | CHEEKWALL "B" | $150-\left(\frac{300}{TAN(A1)}\right)+300\left(TAN\left(\frac{AB}{2}\right)\right)$ | | 194 |
| IF CA $\geq$ 150 USE CONDITION 1 EQUATIONS, OTHERWISE USE CONDITION 2 EQUATIONS | | | | |
| CONDITION 1 EQUATIONS | | | | |
| CA | CHEEKWALL "B" | AS CALCULATED ABOVE | | 194 |
| CB | CHEEKWALL "B" | $300\left(TAN\left(\frac{AB}{2}\right)\right)$ | | 124 |
| CC | CHEEKWALL "B" | 150 | | 150 |
| CONDITION 2 EQUATIONS | | | | |
| CA | CHEEKWALL "B" | 150 | | |
| CB | CHEEKWALL "B" | $300\left(TAN\left(\frac{AB}{2}\right)\right)$ | | |
| CC | CHEEKWALL "B" | $150+\left(\frac{300}{TAN(A1)}\right)-300\left(TAN\left(\frac{AB}{2}\right)\right)$ | | |
| DA | WINGWALL "A" LENGTH | AC+BB | | 2889 |
| DB | WINGWALL "B" LENGTH | AD+CB | | 2374 |
| EA | ABUTMENT LENGTH | $\frac{C2+30}{SIN(A1)}$ | | 1690 |
| EB | ABUTMENT LENGTH | EA+BA+CA | | 2153 |
| EC | ABUTMENT LENGTH | $\frac{EA}{2}+BA$ | | 1115 |
| ED | ABUTMENT LENGTH | $\frac{EA}{2}+CA$ | | 1039 |
| EE | ABUTMENT LENGTH | $\frac{110\ mm}{TAN(A1)}$ | | 29 |
| FA | WINGWALL "A" HEIGHT | (20 - 15)1000 | (2) | 2539 |
| FB | WINGWALL "A" HEIGHT | (22 - 15)1000 | (2) | 1554 |
| FC | WINGWALL "A" HEIGHT | (20 - 22)1000 | (2) | 985 |
| FD | WINGWALL REINFORCEMENT PROJECTION | DESIGNER | (3) | 510 |
| GA | WINGWALL "B" HEIGHT | (30 - 15)1000 | (2) | 2561 |
| GB | WINGWALL "B" HEIGHT | (32 - 15)1000 | (2) | 1554 |
| GC | WINGWALL "B" HEIGHT | (30 - 32)1000 | (2) | 1007 |
| GD | WINGWALL REINFORCEMENT PROJECTION | DESIGNER | (3) | 510 |
| HA | HEIGHT OF FINISH GRADE CHAMFER (ABUTMENT) | (16 - 15)1000 | (2) | 489 |
| HB | REAR FACE REINFORCEMENT PROJECTION (ABUTMENT) | DESIGNER | (3) | 510 |
| IA | ABUTMENT FOOTING WIDTH | DESIGNER | (3) | 2725 |
| IB | ABUTMENT FOOTING WIDTH | DESIGNER | (3) | 975 |
| IC | ABUTMENT FOOTING WIDTH | IA-IB | | 1750 |
| JA | WINGWALL "A" FOOTING WIDTH | DESIGNER | (3) | 2475 |
| JB | WINGWALL "A" FOOTING WIDTH | DESIGNER | (3) | 975 |
| JC | WINGWALL "A" FOOTING WIDTH | JA-JB | | 1500 |
| KA | WINGWALL "B" FOOTING WIDTH | DESIGNER | (3) | 1975 |
| KB | WINGWALL "B" FOOTING WIDTH | DESIGNER | (3) | 675 |
| KC | WINGWALL "B" FOOTING WIDTH | KA-KB | | 1300 |
| LA | ABUTMENT FOOTING LENGTH | $EB-\frac{IB}{TAN(AA)}+\frac{JB}{SIN(AA)}-\frac{IB}{TAN(AB)}+\frac{KB}{SIN(AB)}$ | | 2261 |
| LB | ABUTMENT FOOTING LENGTH | $EB+\frac{IC}{TAN(AA)}-\frac{JC}{SIN(AA)}+\frac{IC}{TAN(AB)}-\frac{KC}{SIN(AB)}$ | | 2800 |
| MA | WINGWALL "A" FOOTING LENGTH | $\frac{IB}{SIN(AA)}-\frac{JB}{TAN(AA)}$ | | 128 |
| MB | WINGWALL "A" FOOTING LENGTH | $DA+\frac{IB}{SIN(AA)}-\frac{JB}{TAN(AA)}$ | | 3018 |
| MC | WINGWALL "A" FOOTING LENGTH | $DA+\frac{JC}{TAN(AA)}-\frac{IC}{SIN(AA)}$ | | 1726 |
| NA | WINGWALL "B" FOOTING LENGTH | $\frac{IB}{SIN(AB)}-\frac{KB}{TAN(AB)}$ | | 704 |
| NB | WINGWALL "B" FOOTING LENGTH | $DB+\frac{IB}{SIN(AB)}-\frac{KB}{TAN(AB)}$ | | 3078 |
| NC | WINGWALL "B" FOOTING LENGTH | $DB+\frac{KC}{TAN(AB)}-\frac{IC}{SIN(AB)}$ | | 1199 |

FOOTNOTES FOR TABLES

(1) SEE APPROPRIATE SUPERSTRUCTURE DATA ASSEMBLY SHEETS (SHEETS 1 THRU 4 FOR 101M).

(2) SEE SHEET 6 OF 101M FOR CONTROL ELEVATIONS.

(3) DESIGN ABUTMENT AND RETAINING WALLS IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS. USE DATA ASSEMBLY AND CONSTRUCTION SHEETS TO CALCULATE THE NECESSARY DIMENSIONS AND REINFORCEMENT FOR THE ABUTMENT (WITHOUT BACKWALL), WINGWALLS, AND SPREAD FOOTING.

(4) SEE SHEET 6 OF 101M FOR WINGWALL EXAMPLE.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| REVISIONS | | | | | |

SPREAD FOOTING ABUTMENT 2

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

PROFESSIONAL
PATRICK SHAWN POWERS
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 5 | DATA ASSEMBLY SHEETS 10 |

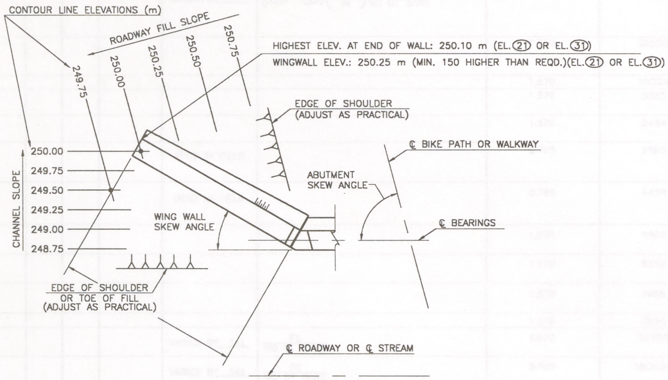


PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

## CONTROL ELEVATIONS

| CODE | DESCRIPTION | | SOURCE | | VALUE (m) |
|---|---|---|---|---|---|
| 10 | ABUTMENT ELEVATION | | USE 1 FOR ABUT. 1, OR 2 FOR ABUT. 2 | (1) | 30.562 |
| 11 | ABUTMENT ELEVATION | BICYCLE/EMERGENCY VEHICLE SUPER. | $⑩-(40-D2-A)\left(\frac{m}{1*10^3 mm}\right)$ | | 29.856 |
| | | PEDESTRIAN SUPERSTRUCTURE | $⑩-(D2-A)\left(\frac{m}{1*10^3 mm}\right)$ | | |
| 12 | ABUTMENT ELEVATION | | $⑪+\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 1 | 29.867 |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $⑪-\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 2 | |
| 13 | ABUTMENT ELEVATION | | $⑪-\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 1 | 29.845 |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $⑪+\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 2 | |
| 14 | BOTTOM OF FOOTING ELEVATION | | DESIGNER | | 27.712 |
| 15 | TOP OF FOOTING ELEVATION | | $⑭+450\left(\frac{m}{1*10^3 mm}\right)$ | | 28.162 |
| 16 | SCOUR DEPTH | | DESIGNER | | 28.651 |
| 20 | WINGWALL "A" ELEVATION | | $⑩-\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 1 | 30.701 |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $⑩+\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 2 | |
| 21 | WINGWALL "A" ELEVATION | | DESIGNER (SEE WINGWALL EXAMPLE) | | 29.566 |
| 22 | WINGWALL "A" ELEVATION | | $㉑+150\left(\frac{m}{1*10^3 mm}\right)$ | | 29.716 |
| 30 | WINGWALL "B" ELEVATION | | $⑩+\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 1 | 30.723 |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $⑩-\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 2 | |
| 31 | WINGWALL "B" ELEVATION | | DESIGNER (SEE WINGWALL EXAMPLE) | | 29.566 |
| 32 | WINGWALL "B" ELEVATION | | $㉛+150\left(\frac{m}{1*10^3 mm}\right)$ | | 29.716 |

IN GENERAL, PROVIDE WINGWALLS OF SUFFICIENT LENGTH TO RETAIN THE ROADWAY EMBANKMENT TO THE REQUIRED EXTENT AND TO FURNISH PROTECTION AGAINST EROSION COMPUTE WINGWALL LENGTHS USING THE ACTUAL CONDITION AT THE SITE. THE FOLLOWING METHOD IS PROPOSED TO COMPUTE THE REQUIRED LENGTHS.




**WINGWALL EXAMPLE**

NO SCALE

## QUANTITIES

| ITEM | | QUANTITY FORMULA | | UNIT | SUBTOTAL | TOTAL |
|---|---|---|---|---|---|---|
| CLASS 3 EXCAVATION | | DESIGNER | | $m^3$ | 20.0 | 20.0 |
| CHEEKWALL A | CLASS AA CEMENT CONCRETE | $\left(BB+150+\frac{BA-150-BB}{2}\right)300\left(\frac{m^2}{1*10^6 mm^2}\right)(⑳-⑫)$ | | $m^3$ | 0.05 | 0.18 |
| CHEEKWALL B | | $\left(CB+150+\frac{150+CB-CA}{2}\right)300\left(\frac{m^2}{1*10^6 mm^2}\right)(㉚-⑬)$ | CONDITION 1 | $m^3$ | 0.13 | |
| | | $\left(2(CB)-150+\frac{CC+CB-150}{2}\right)300\left(\frac{m^2}{1*10^6 mm^2}\right)(㉚-⑬)$ | CONDITION 2 | $m^3$ | | |
| ABUTMENT | CLASS A CEMENT CONCRETE | $\left[0.45(⑪-⑮)+\left(\frac{1}{2}\right)\left(\frac{1}{10}\right)(⑪-⑮)^2\right](EB)\left(\frac{m}{1*10^3 mm}\right)$ | | $m^3$ | 2.51 | 63.41 |
| WINGWALL A | | $\left[0.45\left(㉒+\frac{⑪-⑮}{2}-⑮\right)+\left(\frac{1}{2}\right)\left(\frac{1}{10}\right)\left(㉒+\frac{⑪-⑮}{2}-⑮\right)^2\right](AC)\left(\frac{m}{1*10^3 mm}\right)$ | | $m^3$ | 31.7 | |
| WINGWALL B | | $\left[0.45\left(㉜+\frac{㉚-㉜}{2}-⑮\right)+\left(\frac{1}{2}\right)\left(\frac{1}{10}\right)\left(㉜+\frac{㉚-㉜}{2}-⑮\right)^2\right](AD)\left(\frac{m}{1*10^3 mm}\right)$ | | $m^3$ | 14.5 | |
| FOOTING | | $\left(\frac{1}{2}\right)(600)\left((LA+LB)(IA)+(MB+MC)(JA)+(NB+NC)(KA)\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | | $m^3$ | 14.7 | |
| SELECTED BORROW EXCAVATION, STRUCTURE BACKFILL | | DESIGNER | | $m^3$ | 15.0 | 15.0 |
| NO. 57 COARSE AGGREGATE | | 4 WEEPHOLES$\left(\frac{0.4m^3}{WEEPHOLE}\right)$ | | $m^3$ | 1.6 | 1.6 |
| REINFORCEMENT BARS | | DESIGNER – CALCULATE BAR MASS FROM SHEETS 7 & 8 OF 101M | | kg | 3606616 | 3606616 |
| REINFORCEMENT BARS, EPOXY COATED | | DESIGNER – CALCULATE BAR MASS FROM SHEETS 7 & 8 OF 101M | | kg | 937453 | 937453 |

**FOOTNOTES FOR TABLES**

(1) SEE APPROPRIATE SUPERSTRUCTURE DATA ASSEMBLY SHEETS (101M SHEETS 1 THRU 4).

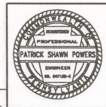
| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

SPREAD FOOTING ABUTMENT 2

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA




ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 6 | DATA ASSEMBLY SHEETS 11 |


PREPARED BY:
POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

## BAR SCHEDULE

| MARK | SIZE | SOURCE | LENGTH | SOURCE | NO. | SOURCE | TYPE | A | B | C | H | J | K | SOURCE | REMARKS | SOURCE | BAR MASS kg/m (4) | TOTAL BAR MASS (5) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1500 | 15 | | FROM 1655<br>TO 1633 | $\left[(12-15)\left(\frac{1000}{m}\right)\right]-50$<br>$\left[(13-15)\left(\frac{1000}{m}\right)\right]-50$ | 6 | $\left\{\frac{EB-75}{450}+0.99\right\}+1$ (1) | STR. | | | | | | | | VARIES BY 4 | $\left((13)-(12)\right)\left(\frac{1000}{m}\right)\frac{1}{\text{NO OF BARS}}$ | 1.570 | 19622 |
| A 15 01 | 15 | DESIGNER (2) | FROM 1655<br>TO 1633 | $\left[(12-15)\left(\frac{1000}{m}\right)\right]-50$<br>$\left[(13-15)\left(\frac{1000}{m}\right)\right]-50$ | 6 | $\left\{\frac{EB-150(TAN(AA))-150(TAN(AB))}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ (1)(2) | STR. | | | | | | | | VARIES BY 4 | $\left((13)-(12)\right)\left(\frac{1000}{m}\right)\frac{1}{\text{NO OF BARS}}$ | 3.925 | 81758 |
| A1502 | 15 | | 2153 | EB | 4 | $\left\{\frac{(11)+\lvert(11)-(13)\rvert-(15))\left(\frac{1000}{m}\right)-600}{450}+0.99\right\}+1$ (2)(3) | STR. | | | | | | | | | | 1.570 | 16556 |
| A1503 | 15 | | 1963 | EB−150(TAN(AA))−150(TAN(AB)) | 4 | SAME AS A1502 | STR. | | | | | | | | | | 1.570 | 15064 |
| A1504 | 15 | | 2153 | $\sqrt{((13)-(12))^2+(EB)^2}$ | 1 | | STR. | | | | | | | | | | 1.570 | 3313 |
| A1505 | 15 | | 1963 | $\sqrt{((13)-(12))^2+(EB-150(TAN(AA))-150(TAN(AB)))^2}$ | 1 | | STR. | | | | | | | | | | 1.570 | 3484 |
| EA1006 | 10 | | 950 | $(BA-40)+490+\left(\frac{300}{SIN(A1)}-80\right)$ | 4 | $\left\{\frac{((20)-(12))\left(\frac{1000}{m}\right)-100}{250}+0.99\right\}+1$ (1) | STR. | | | | | | | | BEND IN FIELD | | 0.785 | 2983 |
| EA1007 | 10 | | 875 | $(CA-40)+(CC-80)+420+\left(\frac{300}{SIN(A1)}-80\right)$ | 5 | $\left\{\frac{((30)-(13))\left(\frac{1000}{m}\right)-100}{250}+0.99\right\}+1$ (1) | STR. | | | | | | | | BEND IN FIELD | | 0.785 | 4439 |
| EA1508 | 15 | | 1284 | $((20)-(12))\left(\frac{1000}{m}\right)+450$ | 5 | USE 4 BARS FOR 90° SKEWS, AND 5 BARS ALL OTHER SKEWS | STR. | | | | | | | | | | 1.570 | 9969 |
| EA1509 | 15 | | 1328 | $((30)-(13))\left(\frac{1000}{m}\right)+450$ | 4 | | STR. | | | | | | | | | | 1.570 | 8252 |
| A1510 | 15 | | 950 | | 3 | $\left\{\frac{\text{NO. OF BARS FROM A\_\_01}+1}{2}\right\}$ (1) | 3 | 400 | 175 | 400 | | | 40 | | | | 1.570 | 7458 |
| A1511 | 15 | | 300 | | 16 | | STR. | | | | | | | | | | 1.570 | 7536 |
| W1520 | 15 | | FROM 1504<br>TO 2489 | FB−50<br>FA−50 | 7 | $\left\{\frac{AC-150}{450}+0.99\right\}+1$ (1) | STR. | | | | | | | | VARIES BY 141 | $\frac{FC}{\text{NO OF BARS}}$ | 1.570 | 72233 |
| W 15 21 | 15 | DESIGNER (2) | FROM 1504<br>TO 2489 | FB−50<br>FA−50 | 7 | $\left\{\frac{AC-150}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ (1)(2) | STR. | | | | | | | | VARIES BY 141 | $\frac{FC}{\text{NO OF BARS}}$ | 3.925 | 180620 |
| W1522 | 15 | | 2750 | AC−100 | 5<br>10 | $\left\{\frac{FB-150}{450}+0.99\right\}+1$ SHOW ON DRAWINGS (1)<br>$2\left\{\frac{FB-150}{450}+0.99\right\}+1$ SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) (1) | STR. | | | | | | | | | | 1.570 | 148836 |
| W1523 | 15 | | FROM 1703<br>TO 838 | $\frac{(FC-375)(AC-100)}{FC}$<br>$\frac{300(AC-100)}{FC}$ | 2<br>4 | $\left\{\frac{FC-675}{450}+0.99\right\}+1$ SHOW ON DRAWINGS (1)<br>$2\left\{\frac{FC-675}{450}+0.99\right\}+1$ SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) | STR. | | | | | | | | VARIES BY 433 | $\frac{\text{(LENGTH FROM 2892)}-\text{(LENGTH TO 2406)}}{\text{NO OF BARS}}$ | 1.570 | 22916 |
| W1524 | 15 | | 2915 | $\sqrt{FC^2+AC^2}-100$ | 1<br>2 | SHOW ON DRAWINGS<br>SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) | STR. | | | | | | | | | | 1.570 | 24994 |
| W1525 | 15 | | 975 | | 4 | $\left\{\frac{\text{NO. OF BARS FROM W\_\_21}+1}{2}\right\}$ (1) | 3 | 400 | 175 | 400 | | | 40 | | | | 1.570 | 15308 |
| W1526 | 15 | | 300 | | 8 | | STR. | | | | | | | | | | 1.570 | 3768 |
| W1530 | 15 | | FROM 1504<br>TO 2511 | GB−50<br>GA−50 | 6 | $\left\{\frac{AD-150}{450}+0.99\right\}+1$ (1) | STR. | | | | | | | | VARIES BY 168 | $\frac{GC}{\text{NO OF BARS}}$ | 1.570 | 87838 |
| W 15 31 | 15 | DESIGNER (2) | FROM 1504<br>TO 2511 | GB−50<br>GA−50 | 6 | $\left\{\frac{AD-150}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ (1)(2) | STR. | | | | | | | | VARIES BY 168 | $\frac{GC}{\text{NO OF BARS}}$ | 2.355 | 194770 |
| W1532 | 15 | | 2150 | AD−100 | 5<br>10 | $\left\{\frac{GB-150}{450}+0.99\right\}+1$ SHOW ON DRAWINGS (1)<br>$2\left\{\frac{GB-150}{450}+0.99\right\}+1$ SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) (1) | STR. | | | | | | | | | | 1.570 | 186516 |
| W1533 | 15 | | FROM 1349<br>TO 641 | $\frac{(GC-375)(AD-100)}{GC}$<br>$\frac{300(AD-100)}{GC}$ | 2<br>4 | $\left\{\frac{GC-675}{450}+0.99\right\}+1$ SHOW ON DRAWINGS (1)<br>$2\left\{\frac{GC-675}{450}+0.99\right\}+1$ SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) (1) | STR. | | | | | | | | VARIES BY 354 | $\frac{\text{(LENGTH FROM 6213)}-\text{(LENGTH TO 2949)}}{\text{NO OF BARS}}$ | 1.570 | 28768 |

FOOTNOTES FOR TABLE

(1) TAKE THE INTEGER VALUE OF THE QUANTITY WITHIN THE { }

(2) DESIGN ABUTMENT AND RETAINING WALLS IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS. USE DATA ASSEMBLY AND CONSTRUCTION SHEETS TO CALCULATE THE NECESSARY DIMENSIONS AND REINFORCEMENT FOR THE ABUTMENT (WITHOUT BACKWALL), WINGWALLS, AND SPREAD FOOTING.

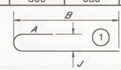
(3) TAKE THE ABSOLUTE VALUE OF THE QUANTITY WITHIN THE | |

(4) USE TABLE 1 ON THIS SHEET TO COMPLETE BAR MASS QUANTITIES.

(5) TOTAL BAR MASS = (BAR LENGTH OR AVERAGE BAR LENGTH)(TOTAL NO. OF BARS)(BAR MASS)

### TABLE 1
### REINFORCEMENT INFORMATION

| BAR SIZE | RECOMMENDED END HOOK DIMENSIONS (ALL GRADES) 180° HOOKS A | J | BAR MASS kg/m |
|---|---|---|---|
| 10 | 150 | 90 | 0.785 |
| 15 | 180 | 130 | 1.570 |
| 20 | 220 | 160 | 2.355 |
| 25 | 280 | 200 | 3.925 |
| 30 | 400 | 300 | 5.495 |
| 35 | 470 | 360 | 7.850 |
| 45 | 670 | 530 | 11.775 |
| 55 | 860 | 680 | 19.625 |




| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

SPREAD FOOTING ABUTMENT 2

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL PATRICK SHAWN POWERS ENGINEER

ENGINEER'S SEAL

PREPARED BY:

POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA



| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 7 | DATA ASSEMBLY SHEETS 12 |

# BAR SCHEDULE

| MARK | SIZE | SOURCE | LENGTH | SOURCE | NO. | SOURCE | TYPE | A | B | C | H | J | K | SOURCE | REMARKS | SOURCE | BAR MASS kg/m (4) | TOTAL BAR MASS (5) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1534 | 15 | | 2365 | $\sqrt{GC^2 + AD^2} - 100$ | 1<br>2 | SHOW ON DRAWINGS<br>SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) | STR. | | | | | | | | | | 1.570 | 31246 |
| W1535 | 15 | | 975 | | 3 | $\left\{\frac{\text{NO. OF BARS FROM W\_\_ 31} + 1}{2}\right\}$ (1) | ③ | 400 | 175 | 400 | | | 40 | | | | 1.570 | 26023 |
| W1536 | 15 | | 300 | | 8 | | STR. | | | | | | | | | | 1.570 | 3768 |
| F15 00 | 15 | DESIGNER (2) | 2525 | IA−200 | 6 | $\left\{\frac{LA-150}{\text{REQ. SPA. (DESIGNER)}} + 0.99\right\} + 1$ (1)(2) | STR. | | | | | | | | | | 5.495 | 32970 |
| F15 01 | 15 | DESIGNER (2) | 2525 | IA−200 | 6 | $\left\{\frac{LA-150}{\text{REQ. SPA. (DESIGNER)}} + 0.99\right\} + 1$ (1)(2) | STR. | | | | | | | | | | 2.355 | 14130 |
| F1502 | 15 | | 2061 | LA−200 | 7 | $\left\{\frac{IA-200}{450} + 0.99\right\} + 1$ (1) | STR. | | | | | | | | | | 1.570 | 13018 |
| F1003 | 10 | | 550 | | 16 | $\left(\left\{\frac{IA-200}{950} + 0.99\right\} + 1\right)\left(\left\{\frac{LA-150}{950} + 0.99\right\} + 1\right)$ (1) | ② | 125 | 300 | 125 | 75 | | | | | | 0.785 | 5181 |
| F1504 | 15 | | 900 | | 6 | $\left\{\frac{EB}{450} + 0.99\right\} + 1$ (1) | STR. | | | | | | | | | | 1.570 | 8478 |
| EF15 06 | 15 | DESIGNER (2) | 1040 | HB+350+A<br>FOR "A" VARIABLE SEE TABLE 1 | 6 | $\left\{\frac{EB-150(TAN(AA))-150(TAN(AB))}{\text{REQ. SPA. (DESIGNER)}} + 0.99\right\} + 1$ (1)(2) | ① | | | | | | | SEE TABLE 1 (B = HB + 350) | | | 3.925 | 54165 |
| F15 20 | 15 | DESIGNER (2) | 2275 | JA−200 | 8 | $\left\{\frac{MB-150}{\text{REQ. SPA. (DESIGNER)}} + 0.99\right\} + 1$ (1)(2) | STR. | | | | | | | | | | 5.495 | 104405 |
| F15 21 | 15 | DESIGNER (2) | 2275 | JA−200 | 8 | $\left\{\frac{MB-150}{\text{REQ. SPA. (DESIGNER)}} + 0.99\right\} + 1$ (1)(2) | STR. | | | | | | | | | | 1.570 | 29830 |
| F1522 | 15 | | 2818 | MB−200 | 7 | $\left\{\frac{JA-200}{450} + 0.99\right\} + 1$ (1) | STR. | | | | | | | | | | 1.570 | 49480 |
| F1023 | 10 | | 700 | | 20 | $\left(\left\{\frac{JA-200}{950} + 0.99\right\} + 1\right)\left(\left\{\frac{MB-150}{950} + 0.99\right\} + 1\right)$ (1) | ② | 125 | 300 | 125 | 75 | | | | | | 0.785 | 16485 |
| F1524 | 15 | | 900 | | 7 | $\left\{\frac{AC-150}{450} + 0.99\right\} + 1$ (1) | STR. | | | | | | | | | | 1.570 | 26847 |
| EF15 25 | 15 | DESIGNER (2) | 1040 | FD+350+A<br>FOR "A" VARIABLE SEE TABLE 1 | 13 | $\left\{\frac{AC-150}{\text{REQ. SPA. (DESIGNER)}} + 0.99\right\} + 1$ (1)(2) | ① | | | | | | | SEE TABLE 1 (B = FD + 350) | | | 3.925 | 180864 |
| F15 30 | 15 | DESIGNER (2) | 1775 | KA−200 | 8 | $\left\{\frac{NB-150}{\text{REQ. SPA. (DESIGNER)}} + 0.99\right\} + 1$ (1)(2) | STR. | | | | | | | | | | 2.355 | 82425 |
| F15 31 | 15 | DESIGNER (2) | 1775 | KA−200 | 8 | $\left\{\frac{NB-150}{\text{REQ. SPA. (DESIGNER)}} + 0.99\right\} + 1$ (1)(2) | STR. | | | | | | | | | | 1.570 | 68950 |
| F1532 | 15 | | 2878 | NB−200 | 5 | $\left\{\frac{KA-200}{450} + 0.99\right\} + 1$ (1) | STR. | | | | | | | | | | 1.570 | 63108 |
| F1033 | 10 | | 700 | | 15 | $\left(\left\{\frac{KA-200}{950} + 0.99\right\} + 1\right)\left(\left\{\frac{NB-150}{950} + 0.99\right\} + 1\right)$ (1) | ② | 125 | 300 | 125 | 75 | | | | | | 0.785 | 19782 |
| F1534 | 15 | | 900 | | 6 | $\left\{\frac{AD-150}{450} + 0.99\right\} + 1$ (1) | STR. | | | | | | | | | | 1.570 | 32499 |
| EF15 35 | 15 | DESIGNER (2) | 1040 | GD+350+A<br>FOR "A" VARIABLE SEE TABLE 1 | 6 | $\left\{\frac{AD-150}{\text{REQ. SPA. (DESIGNER)}} + 0.99\right\} + 1$ (1)(2) | ① | | | | | | | SEE TABLE 1 (B = GD + 350) | | | 2.355 | 99475 |

FOOTNOTES FOR TABLE

(1) TAKE THE INTEGER VALUE OF THE QUANTITY WITHIN THE { }

(2) DESIGN ABUTMENT AND RETAINING WALLS IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS. USE DATA ASSEMBLY AND CONSTRUCTION SHEETS TO CALCULATE THE NECESSARY DIMENSIONS AND REINFORCEMENT FOR THE ABUTMENT (WITHOUT BACKWALL), WINGWALLS, AND SPREAD FOOTING.

(3) TAKE THE ABSOLUTE VALUE OF THE QUANTITY WITHIN THE | |

(4) USE TABLE 1 ON THIS SHEET TO COMPLETE BAR MASS QUANTITIES.

(5) TOTAL BAR MASS = (BAR LENGTH OR AVERAGE BAR LENGTH)(TOTAL NO. OF BARS)(BAR MASS)

TABLE 1
REINFORCEMENT INFORMATION

| BAR SIZE | RECOMMENDED END HOOK DIMENSIONS (ALL GRADES) 180° HOOKS A | J | BAR MASS kg/m |
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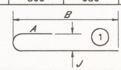
| 30 | 400 | 300 | 5.495 |
| 35 | 470 | 360 | 7.850 |
| 45 | 670 | 530 | 11.775 |
| 55 | 860 | 680 | 19.625 |




| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

SPREAD FOOTING ABUTMENT 2

# PROPOSED PEDESTRIAN BRIDGE OVER KITCHEN CREEK

RICKETTS GLENN STATE PARK
FAIRMOUNT TOWNSHIP, LUZERENE COUNTY, PA



| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 8 | DATA ASSEMBLY SHEETS |



PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

## CONTROL DIMENSIONS

| CODE | DESCRIPTION | | SOURCE | VALUE |
|---|---|---|---|---|
| A1 | SKEW ANGLE | | DESIGNER | DEG. |
| A2 | % GRADE (LOOKING STATIONS AHEAD) | | DESIGNER | |
| B1 | SPAN LENGTH- ℄ TO ℄ BEARING | | DESIGNER | |
| B2 | FRONT FACE TO FRONT FACE OF ABUTMENTS | | $\left(B1-\frac{220}{SIN(A1)}\right)$ | |
| B3 | WATERWAY OPENING | | (B2)SIN(A1) | |
| C1 | CURB TO CURB ROADWAY WIDTH (NORMAL) | | TABLE 1 | |
| C2 | DECK WIDTH OUT TO OUT | | C1+382 | |
| D1 | OUT TO OUT DECKING ALONG ℄ OF ROADWAY | | $B1+\frac{380}{SIN(A1)}$ | |
| D2 | DECK THICKNESS | | TABLE 1 | |
| E1 | NUMBER OF DECK PANELS | COMPLETE FOR GLULAM DECK ONLY | $\left\{\frac{D1*SIN(A1)}{1200}\right\}$ (1) | |
| E2 | DECK PANEL WIDTH ALONG ℄ OF ROADWAY | | $\frac{D1}{E1}$ | |
| E3 | DECK PANEL WIDTH (NORMAL) | | E2*SIN(A1) | |
| E4 | NUMBER OF LAG SCREWS PER DECK PANEL PER BEAM | | $\left\{\frac{E2-300}{300}+1\right\}$ (1) | |
| E5 | LAG SCREW SPACING | | $\frac{E2-300}{E4-1}$ | |
| F1 | OUT TO OUT PARAPET LENGTH | | $D1+\frac{191}{TAN(A1)}$ | |
| F2 | NUMBER OF GUIDE RAIL TIMBER POST SPACES | | $\left\{\frac{D1-1200}{1200}\right\}$ (1) | |
| F3 | GUIDE RAIL POST SPACING | | $\frac{D1-1200}{F2}$ | |
| G1 | NUMBER OF DIAPHRAGMS | | TABLE 1 | |
| H1 | BEAM SPACING (NORMAL) | | TABLE 1 | |
| H2 | BEAM SPACING ALONG SKEW | | $\frac{H1}{SIN(A1)}$ | |
| J1 | NUMBER OF BEAMS | | TABLE 1 | |
| J2 | NUMBER OF BEAM SPACES | | J1-1 | |
| K1 | ℄ FASCIA TO ℄ FASCIA BEAM | | H1*J2 | |
| K2 | ℄ FASCIA TO ℄ FASCIA BEAM ALONG SKEW | | H2*J2 | |
| K3 | ℄ FASCIA BEAM TO OUTSIDE FACE OF DECK | | $\frac{1}{2}(C2-K1)$ | |
| L1 | BEAM LENGTH (OUT TO OUT OF BEAM) | | $B1+\frac{222}{SIN(A1)}$ | |
| L2 | GLULAM BEAM SPECIES COMBINATION | | DESIGNER (5) | |
| L3 | BEAM WIDTH | | TABLE 1 | |
| L4 | BEAM DEPTH | | TABLE 1 | |
| M1 | PRE-FABRICATED CAMBER | | TABLE 1 | |
| M5 | NET FINAL CAMBER | | TABLE 1 | |
| Q1 | BEARING PLATE WIDTH | | $\frac{L3+36}{SIN(A1)}+250$ | |
| S1 | BACKWALL DEPTH | | L4+12 | |
| S2 | BACKWALL LENGTH | CONCRETE ABUTMENTS | $\frac{C2}{SIN(A1)}$ | |
| | | TIMBER SILL ABUTMENTS | $\frac{C2}{SIN(A1)}+\frac{76}{SIN(AA)}+\frac{76}{SIN(AB)}+200$ (2) | |

## CONTROL STATIONS AND ELEVATIONS

| CODE | LOCATION | SOURCE | VALUE (m) | |
|---|---|---|---|---|
| | | | STATION | P.G. ELEV. |
| ① | ℄ BICYCLE PATH OR WALKWAY AT ℄ BRG. ABUT.1 | DESIGNER | | |
| ② | ℄ BICYCLE PATH OR WALKWAY AT ℄ BRG. ABUT.2 | DESIGNER | | |
| ③ | ℄ BICYCLE PATH OR WALKWAY AT BEGIN OF STR. | STA① $-\frac{190}{SIN(A1)}\left(\frac{m}{1*10^3 mm}\right)$ | | ------ |
| ④ | ℄ BICYCLE PATH OR WALKWAY AT END OF STR. | STA② $+\frac{190}{SIN(A1)}\left(\frac{m}{1*10^3 mm}\right)$ | | ------ |

## TABLE 1 – DESIGN DATA (3,4,5)

| SPAN (B1) mm | CURB TO CURB (C1) mm | DECK THICK. (E1) mm | BEAM SPA. (H1) mm | NO. OF BEAMS (J1) # | BEAM WIDTH (L3) mm | BEAM DEPTH (L4) mm | PRE-FABRICATED CAMBER (M1) mm | NET FINAL CAMBER (M5) mm | NO. OF DIAPHRAGMS (G1) # | BRIDGE TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| 3000 | 1220 | 64 | 496 | 3 | 79 | 175 | 3 | 1 | 0 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 210 | 3 | 0 | 0 | |
| | 3600 | 79 | 1020 | 4 | 79 | 315 | 4 | 1 | 0 | BIKE/EMERGENCY |
| 4000 | 1220 | 64 | 496 | 3 | 79 | 245 | 5 | 1 | 0 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 280 | 4 | 1 | 0 | |
| | 3600 | 79 | 1020 | 4 | 79 | 385 | 8 | 1 | 0 | BIKE/EMERGENCY |
| 5000 | 1220 | 64 | 496 | 3 | 79 | 280 | 8 | 1 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 315 | 7 | 1 | 1 | |
| | 3600 | 79 | 1020 | 4 | 79 | 455 | 12 | 2 | 1 | BIKE/EMERGENCY |
| 6000 | 1220 | 64 | 496 | 3 | 79 | 350 | 9 | 2 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 385 | 9 | 1 | 1 | |
| | 3600 | 79 | 1020 | 4 | 79 | 455 | 20 | 3 | 1 | BIKE/EMERGENCY |
| 7000 | 1220 | 64 | 496 | 3 | 79 | 385 | 13 | 2 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 455 | 11 | 2 | 1 | |
| | 3600 | 79 | 1020 | 4 | 79 | 560 | 25 | 4 | 1 | BIKE/EMERGENCY |
| 8000 | 1220 | 64 | 496 | 3 | 79 | 455 | 15 | 2 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 490 | 15 | 3 | 1 | |
| | 3600 | 79 | 1020 | 4 | 79 | 595 | 36 | 6 | 1 | BIKE/EMERGENCY |
| 9000 | 1220 | 64 | 496 | 3 | 79 | 525 | 17 | 3 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 560 | 17 | 3 | 2 | |
| | 3600 | 79 | 1020 | 4 | 79 | 665 | 41 | 7 | 1 | BIKE/EMERGENCY |
| 10000 | 1220 | 64 | 496 | 3 | 79 | 560 | 22 | 4 | 2 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 79 | 630 | 19 | 3 | 2 | |
| | 3600 | 79 | 1020 | 4 | 79 | 735 | 47 | 8 | 2 | BIKE/EMERGENCY |
| 11000 | 1220 | 64 | 496 | 3 | 79 | 630 | 24 | 4 | 2 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 595 | 26 | 4 | 1 | |
| | 3600 | 79 | 1020 | 4 | 130 | 630 | 70 | 12 | 1 | BIKE/EMERGENCY |
| 12000 | 1220 | 64 | 496 | 3 | 130 | 560 | 36 | 6 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 630 | 32 | 5 | 1 | |
| | 3600 | 79 | 1020 | 4 | 130 | 770 | 74 | 12 | 1 | BIKE/EMERGENCY |
| 13000 | 1220 | 64 | 496 | 3 | 130 | 630 | 38 | 6 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 700 | 34 | 6 | 1 | |
| | 3600 | 79 | 1020 | 4 | 130 | 735 | 90 | 15 | 1 | BIKE/EMERGENCY |
| 14000 | 1220 | 64 | 496 | 3 | 130 | 665 | 46 | 8 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 735 | 41 | 7 | 1 | |
| | 3600 | 79 | 1020 | 4 | 130 | 805 | 94 | 16 | 1 | BIKE/EMERGENCY |
| 15000 | 1220 | 64 | 496 | 3 | 130 | 700 | 53 | 9 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 805 | 44 | 7 | 1 | |
| | 3600 | 79 | 1020 | 4 | 130 | 875 | 98 | 16 | 1 | BIKE/EMERGENCY |
| 16000 | 1220 | 64 | 496 | 3 | 130 | 770 | 56 | 9 | 1 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 840 | 51 | 8 | 2 | |
| | 3600 | 79 | 1020 | 4 | 130 | 910 | 114 | 19 | 2 | BIKE/EMERGENCY |
| 17000 | 1220 | 64 | 496 | 3 | 130 | 805 | 64 | 11 | 2 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 910 | 54 | 9 | 2 | |
| | 3600 | 79 | 1020 | 4 | 130 | 980 | 119 | 20 | 2 | BIKE/EMERGENCY |
| 18000 | 1220 | 64 | 496 | 3 | 130 | 840 | 73 | 12 | 2 | PEDESTRIAN |
| | 1625 | 64 | 698 | 3 | 130 | 945 | 62 | 10 | 2 | |
| | 3600 | 79 | 1020 | 4 | 130 | 1050 | 124 | 21 | 2 | BIKE/EMERGENCY |

### FOOTNOTES FOR TABLES

(1) ROUND TO THE NEXT WHOLE NUMBER – ONLY WITHIN { }

(2) SEE SHEET 11 OF 101M FOR VARIABLES "AA" AND "AB"

(3) BEAMS DESIGNED WITH APPROPRIATE WET USE & SIZE FACTOR.

(4) DESIGN TABLE DO NOT ACCOUNT FOR VERTICAL OR HORIZONTAL CURVES ON BRIDGE DECK.

(5) USE EITHER DOUGLAS FIR, RED MAPLE, OR SOUTHERN PINE AS PER SHEET 2 OF 100M.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

REVISIONS

# GLULAM BEAM

ENGINEER'S SEAL

SERIES NO: 101M | SHEET NO: 1 | SERIES TITLE: DATA ASSEMBLY SHEETS

SHEET____of____

PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

## QUANTITIES FOR PEDESTRIAN BRIDGE SUPERSTRUCTURE

| ITEM | | QUANTITY FORMULA | UNIT | SUBTOTAL | TOTAL |
|---|---|---|---|---|---|
| GLUE LAMINATED TIMBER BEAMS | | $J1*L1*L3*L4\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| DECK | SOLID SAWN | $C2*D1*D2\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| RAILING POST | SOLID SAWN | $2\left((F2+1)(140*140)(1200+D2)\right)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| RAILING | SOLID SAWN | $2\left(3(F1)(191)(38)\right)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| CURB | SOLID SAWN | $2(F1)(50)(191)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| BLOCKING | SOLID SAWN | $2\left(2(F2-1)(600)(140)(191)+4(900)(140)(191)\right)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| BACKWALL | GLUE LAMINATED TIMBER | $2(S2)(79)(S1)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| DIAPHRAGMS | GLUE LAMINATED TIMBER | $(G1)J2(L4-100)79(H1-L3)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| BEARING PLATE ASSEMBLIES | | $2(J1)\left((Q1)(195)(12)+2(150)(100)(12)\right)\left(\frac{m^3}{1*10^9\,mm^3}\right)\left(7580\,\frac{kg}{m^3}\right)$ | kg | | |
| SELECT SURFACE TREATMENT | | $(THICKNESS)(C1)D1\left(\frac{m^3}{1*10^9\,mm^3}\right)2250\left(\frac{kg}{m^3}\right)$ | kg | | |
| 152um POLYURETHANE | | $2(S2)(S1+D2+300)\left(\frac{m^2}{1*10^6\,mm^2}\right)$ | $m^2$ | | |

FOOTNOTES FOR TABLE:

(1) THICKNESS IS DETERMINED BY DESIGNER (10 MAX.)

## QUANTITIES FOR BIKE/EMERGENCY VEHICLE BRIDGE SUPERSTRUCTURE

| ITEM | | QUANTITY FORMULA | UNIT | SUBTOTAL | TOTAL |
|---|---|---|---|---|---|
| GLUE LAMINATED TIMBER BEAMS | | $J1*L1*L3*L4\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| DECK | GLUE LAMINATED TIMBER | $C2*E1*E2*D2\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| BACKWALL | GLUE LAMINATED TIMBER | $2(S3)(79)\left(\frac{S1+S2}{2}\right)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| DIAPHRAGMS | GLUE LAMINATED TIMBER | $(G1)J2(L4-100)79(H1-L3)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| RAILING POST | SOLID SAWN | $2\left((F2+1)(140*140)(1550+D2)\right)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| RAILING | SOLID SAWN | $2\left(4(F1)(191)(38)\right)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| CURB | SOLID SAWN | $2(F1)(50)(191)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| BLOCKING | SOLID SAWN | $2\left(2(F2)(600)(140)(191)+4(900)(140)(191)\right)\left(\frac{m^3}{1*10^9\,mm^3}\right)$ | $m^3$ | | |
| BEARING PLATE ASSEMBLIES | | $2(J1)\left((Q1)(195)(12)+2(150)(100)(12)\right)\left(\frac{m^3}{1*10^9\,mm^3}\right)\left(7580\,\frac{kg}{m^3}\right)$ | kg | | |
| 152um POLYURETHANE | | $2(S2)(S1+D2+900)\left(\frac{m^2}{1*10^6\,mm^2}\right)$ | $m^2$ | | |
| WATERPROOF MEMBRANE | | $(D1)(C1)\left(\frac{m^2}{1*10^6\,mm^2}\right)$ | $m^2$ | | |
| BITUMINOUS WEARING COURSE | | $(40)(C1)D1\left(\frac{m^3}{1*10^9\,mm^3}\right)2250\left(\frac{kg}{m^3}\right)$ | kg | | |

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

GLULAM BEAM

PREPARED BY:

POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA



ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 2 | DATA ASSEMBLY SHEETS |

## CONTROL DIMENSIONS

| CODE | DESCRIPTION | SOURCE | | VALUE | |
|---|---|---|---|---|---|
| | | | | | DEG. |
| A1 | SKEW ANGLE | DESIGNER | | | |
| A2 | % GRADE (LOOKING STATIONS AHEAD) | DESIGNER | | | |
| B1 | SPAN LENGTH–℄ TO ℄ BEARING | DESIGNER | | | |
| B2 | FRONT FACE TO FRONT FACE OF ABUTMENTS | $\left(B1-\frac{220}{SIN(A1)}\right)$ | | | |
| B3 | WATERWAY OPENING | (B2)SIN(A1) | | | |
| C1 | CURB TO CURB ROADWAY WIDTH (NORMAL) | TABLE 1 | | | |
| C2 | DECK WIDTH OUT TO OUT | C1+382 | | | |
| C3 | DECK WIDTH OUT TO OUT ALONG SKEW | $\frac{C2}{SIN(A1)}$ | | | |
| D1 | OUT TO OUT LONGITUDINAL PANEL LENGTH | $B1+\frac{380}{SIN(A1)}$ | | | |
| D2 | NUMBER OF LONGITUDINAL PANELS | TABLE 1 | (1) | | |
| E1 | LONGITUDINAL PANEL SPECIES COMBINATION | TABLE 1 | | | |
| E2 | LONGITUDINAL PANEL DEPTH | TABLE 1 | | | |
| E3 | LONGITUDINAL PANEL WIDTH (NORMAL) | $\frac{C2}{D2}$ | | | |
| E4 | LONGITUDINAL PANEL WIDTH ALONG SKEW | $\frac{C3}{D2}$ | | | |
| F1 | OUT TO OUT PARAPET LENGTH | $D1+\frac{191}{TAN(A1)}$ | | | |
| F2 | NUMBER OF GUIDE RAIL TIMBER POST SPACES | $\left\{\frac{D1-1200}{1200}\right\}$ | (1) | | |
| F3 | GUIDE RAIL POST SPACING | $\frac{D1-1200}{F2}$ | | | |
| G1 | NUMBER OF CONTINUOUS STIFFENER BEAMS | TABLE 1 | | | |
| J1 | BEARING PAD LENGTH CONSTRAINT #1 | $\frac{E4}{2}-\frac{125}{2}-\frac{100}{TAN(A1)}-50$ | (CONCRETE ABUTMENT) | | |
| | | $\frac{E4}{3}-\frac{125}{2}-\frac{100}{TAN(A1)}-50$ | (PILE ABUTMENT) | | |
| J2 | BEARING PAD LENGTH CONSTRAINT #2 | $\frac{E4}{3}-125$ | (PILE ABUTMENT) | | |
| J3 | BEARING PAD LENGTH | USE THE VALUE J1 | (CONCRETE ABUTMENT) | | |
| | | USE THE LESSER VALUE BTWN. J1 & J2 | (PILE ABUTMENT) | | |
| J4 | NUMBER OF BEARING PADS | D2*4 | (CONCRETE ABUTMENT) | | |
| | | D2*6 | (PILE ABUTMENT) | | |

## CONTROL STATIONS AND ELEVATIONS

| CODE | LOCATION | SOURCE | VALUE (m) | |
|---|---|---|---|---|
| | | | STATION | P.G. ELEV. |
| 1 | ℄ BICYCLE PATH OR WALKWAY AT ℄ BRG. ABUT.1 | DESIGNER | | |
| 2 | ℄ BICYCLE PATH OR WALKWAY AT ℄ BRG. ABUT.2 | DESIGNER | | |
| 3 | ℄ BICYCLE PATH OR WALKWAY AT BEGIN OF STR. | STA 1 $-\frac{190}{SIN(A1)}\left(\frac{m}{1*10^3\,mm}\right)$ | | ------ |
| 4 | ℄ BICYCLE PATH OR WALKWAY AT END OF STR. | STA 2 $+\frac{190}{SIN(A1)}\left(\frac{m}{1*10^3\,mm}\right)$ | | ------ |

## TABLE 1 – DESIGN DATA (2,3,4)

| SPAN (B1) mm | CURB TO CURB (C1) mm | PANEL DEPTH (L4) mm | NO. OF STIFFENER BEAMS (G2) # | BRIDGE TYPE |
|---|---|---|---|---|
| 3000 | 1220 | 130 | 0 | PEDESTRIAN |
| | 1625 | 130 | 0 | |
| | 3600 | 175 | 1 | BIKE\EMERGENCY |
| 4000 | 1220 | 130 | 0 | PEDESTRIAN |
| | 1625 | 130 | 0 | |
| | 3600 | 219 | 1 | BIKE\EMERGENCY |
| 5000 | 1220 | 219 | 0 | PEDESTRIAN |
| | 1625 | 219 | 0 | |
| | 3600 | 219 | 2 | BIKE\EMERGENCY |
| 6000 | 1220 | 219 | 0 | PEDESTRIAN |
| | 1625 | 219 | 0 | |
| | 3600 | 219 | 2 | BIKE\EMERGENCY |

FOOTNOTES FOR TABLES

(1) ROUND TO THE NEXT WHOLE NUMBER – ONLY WITHIN { }

(2) PANELS DESIGNED WITH APPROPRIATE WET USE & SIZE FACTOR.

(3) DESIGN TABLE DO NOT ACCOUNT FOR VERTICAL OR HORIZONTAL CURVES ON BRIDGE DECK.

(4) USE EITHER DOUGLAS FIR, RED MAPLE, OR SOUTHERN PINE AS PER SHEET 2 OF 100M.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

GLULAM LONGITUDINAL PANEL

ENGINEER'S SEAL

SERIES NO: 101M | SHEET NO: 3 | SERIES TITLE: DATA ASSEMBLY SHEETS

SHEET____of____

PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

## QUANTITIES FOR PEDESTRIAN BRIDGE SUPERSTRUCTURE

| ITEM | | QUANTITY FORMULA | UNIT | SUBTOTAL | TOTAL |
|---|---|---|---|---|---|
| GLUE LAMINATED LONGITUDINAL PANELS | | $C2*E2*D1\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| GLUE LAMINATED STIFFENER BEAMS | | $(G1)(150)^2(C3)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| RAILING POST | SOLID SAWN | $2\left((F2+1)(140*140)(1200+D2)\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| RAILING | SOLID SAWN | $2\left(3(F1)(191)(38)\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| CURB | SOLID SAWN | $2(F1)(50)(191)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| BLOCKING | SOLID SAWN | $2\left(2(F2-1)(600)(140)(191)+4(900)(140)(191)\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| SELECT SURFACE TREATMENT | | $(THICKNESS)(C1)D1\left(\frac{m^3}{1*10^9 mm^3}\right)2250\left(\frac{kg}{m^3}\right)$ (1) | kg | | |
| 152um POLYURETHANE | | $2(C3)(E2+300)\left(\frac{m^2}{1*10^6 mm^2}\right)$ | $m^2$ | | |

FOOTNOTE FOR TABLE:

(1) THICKNESS IS DETERMINED BY DESIGNER (10 MAX.)

## QUANTITIES FOR BIKE/EMERGENCY VEHICLE BRIDGE SUPERSTRUCTURE

| ITEM | | QUANTITY FORMULA | UNIT | SUBTOTAL | TOTAL |
|---|---|---|---|---|---|
| GLUE LAMINATED LONGITUDINAL PANELS | | $C2*E2*D1\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| GLUE LAMINATED STIFFENER BEAMS | | $(G1)(150)^2(C3)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| RAILING POST | SOLID SAWN | $2\left((F2+1)(140*140)(1550+D2)\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| RAILING | SOLID SAWN | $2\left(4(F1)(191)(38)\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| CURB | SOLID SAWN | $2(F1)(50)(191)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| BLOCKING | SOLID SAWN | $2\left(2(F2-1)(600)(140)(191)+4(900)(140)(191)\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| 152um POLYURETHANE | | $2(C3)(E2+900)\left(\frac{m^2}{1*10^6 mm^2}\right)$ | $m^2$ | | |
| WATERPROOF MEMBRANE | | $(D1)(C1)\left(\frac{m^2}{1*10^6 mm^2}\right)$ | $m^2$ | | |
| BITUMINOUS WEARING COURSE | | $(40)(C1)D1\left(\frac{m^3}{1*10^9 mm^3}\right)2250\left(\frac{kg}{m^3}\right)$ | kg | | |

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

GLULAM LONGITUDINAL PANEL

PREPARED BY:

P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA



ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 4 | DATA ASSEMBLY SHEETS |

## CONTROL DIMENSIONS

| CODE | DESCRIPTION | SOURCE | | VALUE |
|---|---|---|---|---|
| A1 | SKEW ANGLE | A1 | (1) | DEG. |
| A2 | % GRADE (LOOKING STATIONS AHEAD) | A2 | (1) | |
| C1 | CURB TO CURB ROADWAY WIDTH (NORMAL) | C1 | (1) | |
| C2 | DECK WIDTH OUT TO OUT | C2 | (1) | |
| D2 | DECK THICKNESS | D2 | (1) | |
| A | BEAM DEPTH | USE L4 FOR GLULAM BEAM OR ZERO (0) FOR LONG. PANEL | (1) | |
| B | BEARING THICKNESS | USE TWELVE (12) FOR GLULAM BEAM OR TWENTY (20) FOR LONG. PANEL | (1) | |
| AA | WINGWALL "A" SKEW ANGLE | DESIGNER (15°00'00" MIN., 45°00'00" MAX.) | (4) | DEG. |
| AB | WINGWALL "B" SKEW ANGLE | DESIGNER (15°00'00" MIN., 45°00'00" MAX.) | (4) | DEG. |
| AC | WINGWALL "A" LENGTH | DESIGNER | (4) | |
| AD | WINGWALL "B" LENGTH | DESIGNER | (4) | |
| BA | CHEEKWALL "A" | $150+\left(\frac{300}{TAN(A1)}\right)+300\left(TAN\left(\frac{AA}{2}\right)\right)$ | | |
| BB | CHEEKWALL "A" | $300\left(TAN\left(\frac{AA}{2}\right)\right)$ | | |
| CA | CHEEKWALL "B" | $150-\left(\frac{300}{TAN(A1)}\right)+300\left(TAN\left(\frac{AB}{2}\right)\right)$ | | |
| IF CA $\geq$ 150 USE CONDITION 1 EQUATIONS, OTHERWISE USE CONDITION 2 EQUATIONS | | | | |
| CONDITION 1 EQUATIONS | | | | |
| CA | CHEEKWALL "B" | AS CALCULATED ABOVE | | |
| CB | CHEEKWALL "B" | $300\left(TAN\left(\frac{AB}{2}\right)\right)$ | | |
| CC | CHEEKWALL "B" | 150 | | |
| CONDITION 2 EQUATIONS | | | | |
| CA | CHEEKWALL "B" | 150 | | |
| CB | CHEEKWALL "B" | $300\left(TAN\left(\frac{AB}{2}\right)\right)$ | | |
| CC | CHEEKWALL "B" | $150+\left(\frac{300}{TAN(A1)}\right)-300\left(TAN\left(\frac{AB}{2}\right)\right)$ | | |
| DA | WINGWALL "A" LENGTH | AC+BB | | |
| DB | WINGWALL "B" LENGTH | AD+CB | | |
| EA | ABUTMENT LENGTH | $\frac{C2+30}{SIN(A1)}$ | | |
| EB | ABUTMENT LENGTH | EA+BA+CA | | |
| EC | ABUTMENT LENGTH | $\frac{EA}{2}+BA$ | | |
| ED | ABUTMENT LENGTH | $\frac{EA}{2}+CA$ | | |
| EE | ABUTMENT LENGTH | $\frac{110\ mm}{TAN(A1)}$ | | |
| FA | WINGWALL "A" HEIGHT | (20 − 15)1000 | (2) | |
| FB | WINGWALL "A" HEIGHT | (22 − 15)1000 | (2) | |
| FC | WINGWALL "A" HEIGHT | (20 − 22)1000 | (2) | |
| FD | WINGWALL REINFORCEMENT PROJECTION | DESIGNER | (3) | |
| GA | WINGWALL "B" HEIGHT | (30 − 15)1000 | (2) | |
| GB | WINGWALL "B" HEIGHT | (32 − 15)1000 | (2) | |
| GC | WINGWALL "B" HEIGHT | (30 − 32)1000 | (2) | |
| GD | WINGWALL REINFORCEMENT PROJECTION | DESIGNER | (3) | |
| HA | HEIGHT OF FINISH GRADE CHAMFER (ABUTMENT) | (16 − 15)1000 | (2) | |
| HB | REAR FACE REINFORCEMENT PROJECTION (ABUTMENT) | DESIGNER | (3) | |
| IA | ABUTMENT FOOTING WIDTH | DESIGNER | (3) | |
| IB | ABUTMENT FOOTING WIDTH | DESIGNER | (3) | |
| IC | ABUTMENT FOOTING WIDTH | IA−IB | | |
| JA | WINGWALL "A" FOOTING WIDTH | DESIGNER | (3) | |
| JB | WINGWALL "A" FOOTING WIDTH | DESIGNER | (3) | |
| JC | WINGWALL "A" FOOTING WIDTH | JA−JB | | |
| KA | WINGWALL "B" FOOTING WIDTH | DESIGNER | (3) | |
| KB | WINGWALL "B" FOOTING WIDTH | DESIGNER | (3) | |
| KC | WINGWALL "B" FOOTING WIDTH | KA−KB | | |
| LA | ABUTMENT FOOTING LENGTH | $EB-\frac{IB}{TAN(AA)}+\frac{JB}{SIN(AA)}-\frac{IB}{TAN(AB)}+\frac{KB}{SIN(AB)}$ | | |
| LB | ABUTMENT FOOTING LENGTH | $EB+\frac{IC}{TAN(AA)}-\frac{JC}{SIN(AA)}+\frac{IC}{TAN(AB)}-\frac{KC}{SIN(AB)}$ | | |
| MA | WINGWALL "A" FOOTING LENGTH | $\frac{IB}{SIN(AA)}-\frac{JB}{TAN(AA)}$ | | |
| MB | WINGWALL "A" FOOTING LENGTH | $DA+\frac{IB}{SIN(AA)}-\frac{JB}{TAN(AA)}$ | | |
| MC | WINGWALL "A" FOOTING LENGTH | $DA+\frac{JC}{TAN(AA)}-\frac{IC}{SIN(AA)}$ | | |
| NA | WINGWALL "B" FOOTING LENGTH | $\frac{IB}{SIN(AB)}-\frac{KB}{TAN(AB)}$ | | |
| NB | WINGWALL "B" FOOTING LENGTH | $DB+\frac{IB}{SIN(AB)}-\frac{KB}{TAN(AB)}$ | | |
| NC | WINGWALL "B" FOOTING LENGTH | $DB+\frac{KC}{TAN(AB)}-\frac{IC}{SIN(AB)}$ | | |

FOOTNOTES FOR TABLES

(1) SEE APPROPRIATE SUPERSTRUCTURE DATA ASSEMBLY SHEETS (SHEETS 1 THRU 4 FOR 101M).

(2) SEE SHEET 6 OF 101M FOR CONTROL ELEVATIONS.

(3) DESIGN ABUTMENT AND RETAINING WALLS IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS. USE DATA ASSEMBLY AND CONSTRUCTION SHEETS TO CALCULATE THE NECESSARY DIMENSIONS AND REINFORCEMENT FOR THE ABUTMENT (WITHOUT BACKWALL), WINGWALLS, AND SPREAD FOOTING.

(4) SEE SHEET 6 OF 101M FOR WINGWALL EXAMPLE.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

REVISIONS

SPREAD FOOTING ABUTMENT ____

PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
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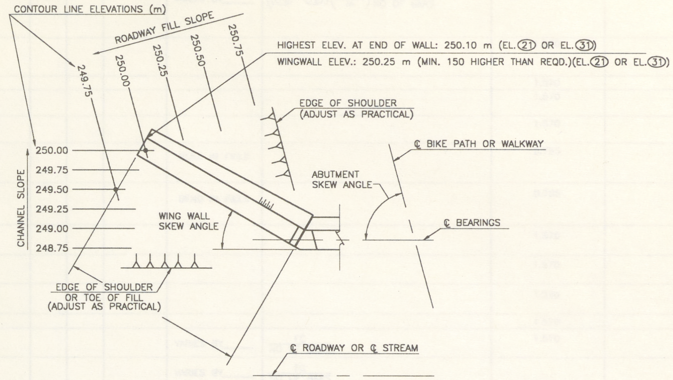
| 101M | 5 | DATA ASSEMBLY SHEETS 10 |

SHEET____of____

## CONTROL ELEVATIONS

| CODE | DESCRIPTION | | SOURCE | | VALUE (m) |
|---|---|---|---|---|---|
| 10 | ABUTMENT ELEVATION | | USE 1 FOR ABUT. 1, OR 2 FOR ABUT. 2 | (1) | |
| 11 | ABUTMENT ELEVATION | BICYCLE/EMERGENCY VEHICLE SUPER. | $10-(40-D2-A)\left(\frac{m}{1*10^3 mm}\right)$ | | |
| | | PEDESTRIAN SUPERSTRUCTURE | $10-(D2-A)\left(\frac{m}{1*10^3 mm}\right)$ | | |
| 12 | ABUTMENT ELEVATION | | $11+\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $11-\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 2 | |
| 13 | ABUTMENT ELEVATION | | $11-\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $11+\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 2 | |
| 14 | BOTTOM OF FOOTING ELEVATION | | DESIGNER | | |
| 15 | TOP OF FOOTING ELEVATION | | $14+450\left(\frac{m}{1*10^3 mm}\right)$ | | |
| 16 | SCOUR DEPTH | | DESIGNER | | |
| 20 | WINGWALL "A" ELEVATION | | $10-\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $10+\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 2 | |
| 21 | WINGWALL "A" ELEVATION | | DESIGNER (SEE WINGWALL EXAMPLE) | | |
| 22 | WINGWALL "A" ELEVATION | | $21+150\left(\frac{m}{1*10^3 mm}\right)$ | | |
| 30 | WINGWALL "B" ELEVATION | | $10+\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $10-\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3 mm}\right)$ | ABUTMENT 2 | |
| 31 | WINGWALL "B" ELEVATION | | DESIGNER (SEE WINGWALL EXAMPLE) | | |
| 32 | WINGWALL "B" ELEVATION | | $31+150\left(\frac{m}{1*10^3 mm}\right)$ | | |

IN GENERAL, PROVIDE WINGWALLS OF SUFFICIENT LENGTH TO RETAIN THE ROADWAY EMBANKMENT TO THE REQUIRED EXTENT AND TO FURNISH PROTECTION AGAINST EROSION COMPUTE WINGWALL LENGTHS USING THE ACTUAL CONDITION AT THE SITE.
THE FOLLOWING METHOD IS PROPOSED TO COMPUTE THE REQUIRED LENGTHS.




**WINGWALL EXAMPLE**
NO SCALE

## QUANTITIES

| ITEM | | QUANTITY FORMULA | | UNIT | SUBTOTAL | TOTAL |
|---|---|---|---|---|---|---|
| CLASS 3 EXCAVATION | | DESIGNER | | $m^3$ | | |
| CHEEKWALL A | CLASS AA CEMENT CONCRETE | $\left(BB+150+\frac{BA-150-BB}{2}\right)300\left(\frac{m^2}{1*10^6 mm^2}\right)(20-12)$ | | $m^3$ | | |
| CHEEKWALL B | | $\left(CB+150+\frac{150+CB-CA}{2}\right)300\left(\frac{m^2}{1*10^6 mm^2}\right)(30-13)$ | CONDITION 1 | $m^3$ | | |
| | | $\left(2(CB)-150+\frac{CC+CB-150}{2}\right)300\left(\frac{m^2}{1*10^6 mm^2}\right)(30-13)$ | CONDITION 2 | $m^3$ | | |
| ABUTMENT | CLASS A CEMENT CONCRETE | $\left[0.45(11-15)+\left(\frac{1}{2}\right)\left(\frac{1}{10}\right)(11-15)^2\right](EB)\left(\frac{m}{1*10^3 mm}\right)$ | | $m^3$ | | |
| WINGWALL A | | $\left[0.45\left(22+\frac{11-15}{2}-15\right)+\left(\frac{1}{2}\right)\left(\frac{1}{10}\right)\left(22+\frac{11-15}{2}-15\right)^2\right](AC)\left(\frac{m}{1*10^3 mm}\right)$ | | $m^3$ | | |
| WINGWALL B | | $\left[0.45\left(32+\frac{30-32}{2}-15\right)+\left(\frac{1}{2}\right)\left(\frac{1}{10}\right)\left(32+\frac{30-32}{2}-15\right)^2\right](AD)\left(\frac{m}{1*10^3 mm}\right)$ | | $m^3$ | | |
| FOOTING | | $\left(\frac{1}{2}\right)(600)\left((LA+LB)(IA)+(MB+MC)(JA)+(NB+NC)(KA)\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | | $m^3$ | | |
| SELECTED BORROW EXCAVATION, STRUCTURE BACKFILL | | DESIGNER | | $m^3$ | | |
| NO. 57 COARSE AGGREGATE | | $4\ WEEPHOLES\left(\frac{0.4m^3}{WEEPHOLE}\right)$ | | $m^3$ | 1.6 | 1.6 |
| REINFORCEMENT BARS | | DESIGNER – CALCULATE BAR MASS FROM SHEETS 7 & 8 OF 101M | | kg | | |
| REINFORCEMENT BARS, EPOXY COATED | | DESIGNER – CALCULATE BAR MASS FROM SHEETS 7 & 8 OF 101M | | kg | | |

**FOOTNOTES FOR TABLES**

(1) SEE APPROPRIATE SUPERSTRUCTURE DATA ASSEMBLY SHEETS (101M SHEETS 1 THRU 4).

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

SPREAD FOOTING ABUTMENT ____


PREPARED BY:
POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA




ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 6 | DATA ASSEMBLY SHEETS 11 |

# BAR SCHEDULE

| MARK | SIZE | SOURCE | LENGTH | SOURCE | NO. | SOURCE | TYPE | A | B | C | H | J | K | SOURCE | REMARKS | SOURCE | BAR MASS kg/m (4) | TOTAL BAR MASS (5) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1500 | 15 | | FROM____<br>TO____ | $\left[((12)-(15))\left(\frac{1000}{m}\right)\right]-50$<br>$\left[((13)-(15))\left(\frac{1000}{m}\right)\right]-50$ | | $\left\{\frac{EB-75}{450}+0.99\right\}+1$ (1) | STR. | | | | | | | | VARIES BY____ | $((13)-(12))\left(\frac{1000}{m}\right)\frac{1}{NO\ OF\ BARS}$ | 1.570 | |
| A___01 | | DESIGNER (2) | FROM____<br>TO____ | $\left[((12)-(15))\left(\frac{1000}{m}\right)\right]-50$<br>$\left[((13)-(15))\left(\frac{1000}{m}\right)\right]-50$ | | $\left\{\frac{EB-150(TAN(AA))-150(TAN(AB))}{REQ.\ SPA.\ (DESIGNER)}+0.99\right\}+1$ (1)(2) | STR. | | | | | | | | VARIES BY____ | $((13)-(12))\left(\frac{1000}{m}\right)\frac{1}{NO\ OF\ BARS}$ | | |
| A1502 | 15 | | | EB | | $\left\{\frac{((11)+\lvert(11)-(13)\rvert-(15))\left(\frac{1000}{m}\right)-600}{450}+0.99\right\}+1$ (2)(3) | STR. | | | | | | | | | | 1.570 | |
| A1503 | 15 | | | EB−150(TAN(AA))−150(TAN(AB)) | | SAME AS A1502 | STR. | | | | | | | | | | 1.570 | |
| A1504 | 15 | | | $\sqrt{((13)-(12))^2+(EB)^2}$ | 1 | | STR. | | | | | | | | | | 1.570 | |
| A1505 | 15 | | | $\sqrt{((13)-(12))^2+(EB-150(TAN(AA))-150(TAN(AB)))^2}$ | 1 | | STR. | | | | | | | | | | 1.570 | |
| EA1006 | 10 | | | $(BA-40)+490+\left(\frac{300}{SIN(A1)}-80\right)$ | | $\left\{\frac{((20)-(12))\left(\frac{1000}{m}\right)-100}{250}+0.99\right\}+1$ (1) | STR. | | | | | | | | BEND IN FIELD | | 0.785 | |
| EA1007 | 10 | | | $(CA-40)+(CC-80)+420+\left(\frac{300}{SIN(A1)}-80\right)$ | | $\left\{\frac{((30)-(13))\left(\frac{1000}{m}\right)-100}{250}+0.99\right\}+1$ (1) | STR. | | | | | | | | BEND IN FIELD | | 0.785 | |
| EA1508 | 15 | | | $((20)-(12))\left(\frac{1000}{m}\right)+450$ | | USE 4 BARS FOR 90° SKEWS, AND 5 BARS ALL OTHER SKEWS | STR. | | | | | | | | | | 1.570 | |
| EA1509 | 15 | | | $((30)-(13))\left(\frac{1000}{m}\right)+450$ | 4 | | STR. | | | | | | | | | | 1.570 | |
| A1510 | 15 | | 950 | | | $\left\{\frac{NO.\ OF\ BARS\ FROM\ A\_\_01+1}{2}\right\}$ (1) | 3 | 400 | 175 | 400 | | | 40 | | | | 1.570 | |
| A1511 | 15 | | 300 | | 16 | | STR. | | | | | | | | | | 1.570 | |
| W1520 | 15 | | FROM____<br>TO____ | FB−50<br>FA−50 | | $\left\{\frac{AC-150}{450}+0.99\right\}+1$ (1) | STR. | | | | | | | | VARIES BY____ | $\frac{FC}{NO\ OF\ BARS}$ | 1.570 | |
| W___21 | | DESIGNER (2) | FROM____<br>TO____ | FB−50<br>FA−50 | | $\left\{\frac{AC-150}{REQ.\ SPA.\ (DESIGNER)}+0.99\right\}+1$ (1)(2) | STR. | | | | | | | | VARIES BY____ | $\frac{FC}{NO\ OF\ BARS}$ | | |
| W1522 | 15 | | | AC−100 | | $\left\{\frac{FB-150}{450}+0.99\right\}+1$ SHOW ON DRAWINGS (1)<br>$2\left\{\frac{FB-150}{450}+0.99\right\}+1$ SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) (1) | STR. | | | | | | | | | | 1.570 | |
| W1523 | 15 | | FROM____<br>TO____ | $\frac{(FC-375)(AC-100)}{FC}$<br>$\frac{300(AC-100)}{FC}$ | | $\left\{\frac{FC-675}{450}+0.99\right\}+1$ SHOW ON DRAWINGS (1)<br>$2\left\{\frac{FC-675}{450}+0.99\right\}+1$ SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) | STR. | | | | | | | | VARIES BY____ | $\frac{(LENGTH\ FROM\ \_\_\_)-(LENGTH\ TO\ \_\_\_)}{NO\ OF\ BARS}$ | 1.570 | |
| W1524 | 15 | | | $\sqrt{FC^2+AC^2}-100$ | 1<br>2 | SHOW ON DRAWINGS<br>SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) | STR. | | | | | | | | | | 1.570 | |
| W1525 | 15 | | 975 | | | $\left\{\frac{NO.\ OF\ BARS\ FROM\ W\_\_21+1}{2}\right\}$ (1) | 3 | 400 | 175 | 400 | | | 40 | | | | 1.570 | |
| W1526 | 15 | | 300 | | 8 | | STR. | | | | | | | | | | 1.570 | |
| W1530 | 15 | | FROM____<br>TO____ | GB−50<br>GA−50 | | $\left\{\frac{AD-150}{450}+0.99\right\}+1$ (1) | STR. | | | | | | | | VARIES BY____ | $\frac{GC}{NO\ OF\ BARS}$ | 1.570 | |
| W___31 | | DESIGNER (2) | FROM____<br>TO____ | GB−50<br>GA−50 | | $\left\{\frac{AD-150}{REQ.\ SPA.\ (DESIGNER)}+0.99\right\}+1$ (1)(2) | STR. | | | | | | | | VARIES BY____ | $\frac{GC}{NO\ OF\ BARS}$ | | |
| W1532 | 15 | | | AD−100 | | $\left\{\frac{GB-150}{450}+0.99\right\}+1$ SHOW ON DRAWINGS (1)<br>$2\left\{\frac{GB-150}{450}+0.99\right\}+1$ SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) (1) | STR. | | | | | | | | | | 1.570 | |
| W1533 | 15 | | FROM____<br>TO____ | $\frac{(GC-375)(AD-100)}{GC}$<br>$\frac{300(AD-100)}{GC}$ | | $\left\{\frac{GC-675}{450}+0.99\right\}+1$ SHOW ON DRAWINGS (1)<br>$2\left\{\frac{GC-675}{450}+0.99\right\}+1$ SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) (1) | STR. | | | | | | | | VARIES BY____ | $\frac{(LENGTH\ FROM\ \_\_\_)-(LENGTH\ TO\ \_\_\_)}{NO\ OF\ BARS}$ | 1.570 | |

**FOOTNOTES FOR TABLE**

(1) TAKE THE INTEGER VALUE OF THE QUANTITY WITHIN THE { }

(2) DESIGN ABUTMENT AND RETAINING WALLS IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS. USE DATA ASSEMBLY AND CONSTRUCTION SHEETS TO CALCULATE THE NECESSARY DIMENSIONS AND REINFORCEMENT FOR THE ABUTMENT (WITHOUT BACKWALL), WINGWALLS, AND SPREAD FOOTING.

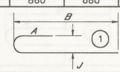
(3) TAKE THE ABSOLUTE VALUE OF THE QUANTITY WITHIN THE | |

(4) USE TABLE 1 ON THIS SHEET TO COMPLETE BAR MASS QUANTITIES.

(5) TOTAL BAR MASS = (BAR LENGTH OR AVERAGE BAR LENGTH)(TOTAL NO. OF BARS)(BAR MASS)

**TABLE 1**
**REINFORCEMENT INFORMATION**

| BAR SIZE | RECOMMENDED END HOOK DIMENSIONS (ALL GRADES) 180° HOOKS | | BAR MASS |
|---|---|---|---|
| | A | J | kg/m |
| 10 | 150 | 90 | 0.785 |
| 15 | 180 | 130 | 1.570 |
| 20 | 220 | 160 | 2.355 |
| 25 | 280 | 200 | 3.925 |
| 30 | 400 | 300 | 5.495 |
| 35 | 470 | 360 | 7.850 |
| 45 | 670 | 530 | 11.775 |
| 55 | 860 | 680 | 19.625 |




| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

SPREAD FOOTING ABUTMENT ____

PREPARED BY:
POWERS & SCHRAM INC.
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STATE COLLEGE, PA



ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 7 | DATA ASSEMBLY SHEETS 12 |

# BAR SCHEDULE

| MARK | SIZE | SOURCE | LENGTH | SOURCE | NO. | SOURCE | | TYPE | A | B | C | H | J | K | SOURCE | REMARKS | SOURCE | BAR MASS kg/m (4) | TOTAL BAR MASS (5) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1534 | 15 | | | $\sqrt{GC^2+AD^2}-100$ | 1<br>2 | SHOW ON DRAWINGS<br>SHOW ON BAR SCHEDULE (TOTAL NO. OF BARS) | | STR. | | | | | | | | | | 1.570 | |
| W1535 | 15 | | 975 | | | $\left\{\frac{\text{NO. OF BARS FROM W\_\_31}+1}{2}\right\}$ | (1) | ③ | 400 | 175 | 400 | | | 40 | | | | 1.570 | |
| W1536 | 15 | | 300 | | 8 | | | STR. | | | | | | | | | | 1.570 | |
| F___00 | | DESIGNER (2) | | IA−200 | | $\left\{\frac{LA-150}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ | (1)(2) | STR. | | | | | | | | | | | |
| F___01 | | DESIGNER (2) | | IA−200 | | $\left\{\frac{LA-150}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ | (1)(2) | STR. | | | | | | | | | | | |
| F1502 | 15 | | | LA−200 | | $\left\{\frac{IA-200}{450}+0.99\right\}+1$ | (1) | STR. | | | | | | | | | | 1.570 | |
| F1003 | 10 | | 550 | | | $\left(\left\{\frac{IA-200}{950}+0.99\right\}+1\right)\left(\left\{\frac{LA-150}{950}+0.99\right\}+1\right)$ | (1) | ② | 125 | 300 | 125 | 75 | | | | | | 0.785 | |
| F1504 | 15 | | 900 | | | $\left\{\frac{EB}{450}+0.99\right\}+1$ | (1) | STR. | | | | | | | | | | 1.570 | |
| EF___06 | | DESIGNER (2) | | HB+350+A<br>FOR "A" VARIABLE SEE TABLE 1 | | $\left\{\frac{EB-150(TAN(AA))-150(TAN(AB))}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ | (1)(2) | ① | | | | | | | SEE TABLE 1<br>(B = HB + 350) | | | | |
| F___20 | | DESIGNER (2) | | JA−200 | | $\left\{\frac{MB-150}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ | (1)(2) | STR. | | | | | | | | | | | |
| F___21 | | DESIGNER (2) | | JA−200 | | $\left\{\frac{MB-150}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ | (1)(2) | STR. | | | | | | | | | | | |
| F1522 | 15 | | | MB−200 | | $\left\{\frac{JA-200}{450}+0.99\right\}+1$ | (1) | STR. | | | | | | | | | | 1.570 | |
| F1023 | 10 | | 700 | | | $\left(\left\{\frac{JA-200}{950}+0.99\right\}+1\right)\left(\left\{\frac{MB-150}{950}+0.99\right\}+1\right)$ | (1) | ② | 125 | 300 | 125 | 75 | | | | | | 0.785 | |
| F1524 | 15 | | 900 | | | $\left\{\frac{AC-150}{450}+0.99\right\}+1$ | (1) | STR. | | | | | | | | | | 1.570 | |
| EF___25 | | DESIGNER (2) | | FD+350+A<br>FOR "A" VARIABLE SEE TABLE 1 | | $\left\{\frac{AC-150}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ | (1)(2) | ① | | | | | | | SEE TABLE 1<br>(B = FD + 350) | | | | |
| F___30 | | DESIGNER (2) | | KA−200 | | $\left\{\frac{NB-150}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ | (1)(2) | STR. | | | | | | | | | | | |
| F___31 | | DESIGNER (2) | | KA−200 | | $\left\{\frac{NB-150}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ | (1)(2) | STR. | | | | | | | | | | | |
| F1532 | 15 | | | NB−200 | | $\left\{\frac{KA-200}{450}+0.99\right\}+1$ | (1) | STR. | | | | | | | | | | 1.570 | |
| F1033 | 10 | | 700 | | | $\left(\left\{\frac{KA-200}{950}+0.99\right\}+1\right)\left(\left\{\frac{NB-150}{950}+0.99\right\}+1\right)$ | (1) | ② | 125 | 300 | 125 | 75 | | | | | | 0.785 | |
| F1534 | 15 | | 900 | | | $\left\{\frac{AD-150}{450}+0.99\right\}+1$ | (1) | STR. | | | | | | | | | | 1.570 | |
| EF___35 | | DESIGNER (2) | | GD+350+A<br>FOR "A" VARIABLE SEE TABLE 1 | | $\left\{\frac{AD-150}{\text{REQ. SPA. (DESIGNER)}}+0.99\right\}+1$ | (1)(2) | ① | | | | | | | SEE TABLE 1<br>(B = GD + 350) | | | | |

**FOOTNOTES FOR TABLE**

(1) TAKE THE INTEGER VALUE OF THE QUANTITY WITHIN THE { }

(2) DESIGN ABUTMENT AND RETAINING WALLS IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS. USE DATA ASSEMBLY AND CONSTRUCTION SHEETS TO CALCULATE THE NECESSARY DIMENSIONS AND REINFORCEMENT FOR THE ABUTMENT (WITHOUT BACKWALL), WINGWALLS, AND SPREAD FOOTING.

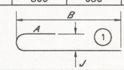
(3) TAKE THE ABSOLUTE VALUE OF THE QUANTITY WITHIN THE | |

(4) USE TABLE 1 ON THIS SHEET TO COMPLETE BAR MASS QUANTITIES.

(5) TOTAL BAR MASS = (BAR LENGTH OR AVERAGE BAR LENGTH)(TOTAL NO. OF BARS)(BAR MASS)

## TABLE 1
## REINFORCEMENT INFORMATION

| BAR SIZE | RECOMMENDED END HOOK DIMENSIONS (ALL GRADES) 180° HOOKS | | BAR MASS |
|---|---|---|---|
| | A | J | kg/m |
| 10 | 150 | 90 | 0.785 |
| 15 | 180 | 130 | 1.570 |
| 20 | 220 | 160 | 2.355 |
| 25 | 280 | 200 | 3.925 |
| 30 | 400 | 300 | 5.495 |
| 35 | 470 | 360 | 7.850 |
| 45 | 670 | 530 | 11.775 |
| 55 | 860 | 680 | 19.625 |




| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

SPREAD FOOTING ABUTMENT ___

PREPARED BY:

POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA



ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 8 | DATA ASSEMBLY SHEETS |

## CONTROL DIMENSIONS

| CODE | DESCRIPTION | SOURCE | | VALUE |
|---|---|---|---|---|
| A1 | SKEW ANGLE | A1 | (1) | DEG. |
| A2 | % GRADE (LOOKING STATIONS AHEAD) | A2 | (1) | |
| C1 | CURB TO CURB ROADWAY WIDTH (NORMAL) | C1 | (1) | |
| C2 | DECK WIDTH OUT TO OUT | C2 | (1) | |
| D2 | DECK THICKNESS | D2 | (1) | |
| A | BEAM DEPTH | USE L4 FOR GLULAM BEAM OR ZERO (0) FOR LONG. PANEL | (1) | |
| B | BEARING THICKNESS | USE TWELVE (12) FOR GLULAM BEAM OR TWENTY (20) FOR LONG. PANEL | (1) | |
| AA | CHEEKWALL LENGTH | $300+\frac{300}{TAN(A1)}$ | (4) | |
| EA | ABUTMENT LENGTH | $\frac{C2+30}{SIN(A1)}$ | | |
| EB | ABUTMENT LENGTH | EA+BA+CA | | |
| EC | ABUTMENT LENGTH | $\frac{EA}{2}+BA$ | | |
| ED | ABUTMENT LENGTH | $\frac{EA}{2}+CA$ | | |
| EA | ABUTMENT LENGTH | $\frac{110\ mm}{TAN(A1)}$ | | |
| FA | WINGWALL "A" HEIGHT | $(20 - 15)1000$ | (2) | |
| GA | WINGWALL "B" HEIGHT | $(30 - 15)1000$ | (2) | |
| HA | HEIGHT OF FINISH GRADE CHAMFER (ABUTMENT) | $(16 - 15)1000$ | (2) | |
| HB | REAR FACE REINFORCEMENT PROJECTION (ABUTMENT) | DESIGNER | (3) | |
| IA | ABUTMENT FOOTING WIDTH | DESIGNER | (3) | |
| IB | ABUTMENT FOOTING WIDTH | DESIGNER | (3) | |
| IC | ABUTMENT FOOTING WIDTH | IA–IB | | |

## CONTROL ELEVATIONS

| CODE | DESCRIPTION | | SOURCE | | VALUE (m) |
|---|---|---|---|---|---|
| 10 | ABUTMENT ELEVATION | | USE 1 FOR ABUT. 1, OR 2 FOR ABUT. 2 | (1) | |
| 11 | ABUTMENT ELEVATION | BICYCLE/EMERGENCY VEHICLE SUPER. | $10-(40-D2-A)\left(\frac{m}{1*10^3\ mm}\right)$ | | |
| | | PEDESTRIAN SUPERSTRUCTURE | $10-(D2+A+B)\left(\frac{m}{1*10^3\ mm}\right)$ | | |
| 12 | ABUTMENT ELEVATION | | $11+\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3\ mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $11-\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3\ mm}\right)$ | ABUTMENT 2 | |
| 13 | ABUTMENT ELEVATION | | $11-\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3\ mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $11+\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)\left(\frac{m}{1*10^3\ mm}\right)$ | ABUTMENT 2 | |
| 14 | BOTTOM OF FOOTING ELEVATION | | DESIGNER | | |
| 15 | TOP OF FOOTING ELEVATION | | $14+450\left(\frac{m}{1*10^3\ mm}\right)$ | | |
| 16 | SCOUR DEPTH | | DESIGNER | | |
| 20 | CHEEKWALL "A" ELEVATION | | $10-\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3\ mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $10+\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3\ mm}\right)$ | ABUTMENT 2 | |
| 30 | CHEEKWALL "B" ELEVATION | | $10+\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3\ mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | | $10-\left(\frac{A2}{100}\left(\frac{EA}{2}(COS(A1))\right)+150\right)\left(\frac{m}{1*10^3\ mm}\right)$ | ABUTMENT 2 | |

## QUANTITIES

| ITEM | | QUANTITY FORMULA | | UNIT | SUBTOTAL | TOTAL |
|---|---|---|---|---|---|---|
| CLASS 3 EXCAVATION | | DESIGNER | | $m^3$ | | |
| CHEEKWALL A | CLASS AA CEMENT CONCRETE | $\left(900+1/2\left(\frac{300}{TAN(A1)}\right)300\right)\left(\frac{m^2}{1*10^6\ mm^2}\right)(20 - 12)$ | | $m^3$ | | |
| CHEEKWALL B | | $\left(900+1/2\left(\frac{300}{TAN(A1)}\right)300\right)\left(\frac{m^2}{1*10^6\ mm^2}\right)(30 - 13)$ | CONDITION 1 | $m^3$ | | |
| | | $\left(2(CB)-150+\frac{CC+CB-150}{2}\right)300\left(\frac{m^2}{1*10^6\ mm^2}\right)(30 - 13)$ | CONDITION 2 | $m^3$ | | |
| ABUTMENT | CLASS A CEMENT CONCRETE | $\left[0.45(11 - 15)+\left(\frac{1}{2}\right)\left(\frac{1}{10}\right)(11 - 15)^2\right](EB)\left(\frac{m}{1*10^3\ mm}\right)$ | | $m^3$ | | |
| FOOTING | | $(450(EA)(IA))\left(\frac{m^3}{1*10^9\ mm^3}\right)$ | | $m^3$ | | |
| SELECTED BORROW EXCAVATION, STRUCTURE BACKFILL | | DESIGNER | | $m^3$ | | |
| NO. 57 COARSE AGGREGATE | | 2 WEEPHOLES$\left(\frac{0.4m^3}{WEEPHOLE}\right)$ | | $m^3$ | 0.8 | 0.8 |
| REINFORCEMENT BARS | | DESIGNER – CALCULATE BAR MASS FROM SHEETS 11 & 12 OF 101M | | kg | | |
| REINFORCEMENT BARS, EPOXY COATED | | DESIGNER – CALCULATE BAR MASS FROM SHEETS 11 & 12 OF 101M | | kg | | |

FOOTNOTES FOR TABLES

(1) SEE APPROPRIATE SUPERSTRUCTURE DATA ASSEMBLY SHEETS (SHEETS 1 THRU 4 FOR 101M).

(2) SEE THIS SHEET FOR CONTROL ELEVATIONS.

(3) DESIGN ABUTMENT AND RETAINING WALLS IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS. USE DATA ASSEMBLY AND CONSTRUCTION SHEETS TO CALCULATE THE NECESSARY DIMENSIONS AND REINFORCEMENT FOR THE ABUTMENT (WITHOUT BACKWALL), WINGWALLS, AND SPREAD FOOTING.

(4) SEE SHEET 6 OF 101M FOR WINGWALL EXAMPLE.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

SPREAD FOOTING ABUTMENT ____ W/O WINGWALLS

PREPARED BY:

POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA



ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 9 | DATA ASSEMBLY SHEETS |

SHEET____of____

## BAR SCHEDULE

| MARK | SIZE | SOURCE | LENGTH | SOURCE | NO. | SOURCE | TYPE | A | B | C | H | J | K | SOURCE | REMARKS | SOURCE | BAR MASS kg/m (4) | TOTAL BAR MASS (5) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1500 | 15 | | FROM____<br>TO____ | $\left[(\textcircled{12}-\textcircled{15})\left(\frac{1000}{m}\right)\right]-50$<br>$\left[(\textcircled{13}-\textcircled{15})\left(\frac{1000}{m}\right)\right]-50$ | | $\left\{\frac{EB-150}{450}+0.99\right\}+1$ (1) | STR. | | | | | | | | VARIES BY 4 | $\left((\textcircled{13}-\textcircled{12})\left(\frac{1000}{m}\right)\frac{1}{NO\ OF\ BARS}\right)$ | 1.570 | 19622 |
| A___01 | | DESIGNER (2) | FROM____<br>TO____ | $\left[(\textcircled{12}-\textcircled{15})\left(\frac{1000}{m}\right)\right]-50$<br>$\left[(\textcircled{13}-\textcircled{15})\left(\frac{1000}{m}\right)\right]-50$ | | $\left\{\frac{EB-150}{REQ.\ SPA.\ (DESIGNER)}+0.99\right\}+1$ (1)(2) | STR. | | | | | | | | VARIES BY 2 | $\left((\textcircled{13}-\textcircled{12})\left(\frac{1000}{m}\right)\frac{1}{NO\ OF\ BARS}\right)$ | | |
| A1502 | 15 | | | EB-100 | | $\left\{\frac{(\textcircled{11}+\lvert\textcircled{11}-\textcircled{13}\rvert-\textcircled{15})\left(\frac{1000}{m}\right)-600}{450}+0.99\right\}+1$ (2)(3) | STR. | | | | | | | | | | 1.570 | |
| A1503 | 15 | | | EB-100 | | SAME AS A1502 | STR. | | | | | | | | | | 1.570 | |
| A1504 | 15 | | | $\sqrt{(\textcircled{13}-\textcircled{12})^2+(EB)^2}$ | 2 | | STR. | | | | | | | | | | 1.570 | |
| EA1006 | 10 | | | $(AA-40)+640+\left(\frac{300}{SIN(A1)}-80\right)$ | | $\left\{\frac{(\textcircled{20}-\textcircled{12})\left(\frac{1000}{m}\right)-100}{250}+0.99\right\}+1$ (1) | STR. | | | | | | | | BEND IN FIELD | | 0.785 | |
| EA1007 | 10 | | | $(AA-40)+640+\left(\frac{300}{SIN(A1)}-80\right)$ | | $\left\{\frac{(\textcircled{30}-\textcircled{13})\left(\frac{1000}{m}\right)-100}{250}+0.99\right\}+1$ (1) | STR. | | | | | | | | BEND IN FIELD | | 0.785 | |
| EA1508 | 15 | | | $(\textcircled{20}-\textcircled{12})\left(\frac{1000}{m}\right)+450$ | | | STR. | | | | | | | | | | 1.570 | |
| EA1509 | 15 | | | $(\textcircled{30}-\textcircled{13})\left(\frac{1000}{m}\right)+450$ | 4 | | STR. | | | | | | | | | | 1.570 | |
| A1510 | 15 | | 950 | | | $\left\{\frac{NO.\ OF\ BARS\ FROM\ A\_\_01+1}{2}\right\}$ (1) | ③ | 400 | 175 | 400 | | | 40 | | | | 1.570 | |
| A1511 | 15 | | 300 | | 16 | | STR. | | | | | | | | | | 1.570 | |
| F___00 | | DESIGNER (2) | | IA-200 | | $\left\{\frac{EB-150}{REQ.\ SPA.\ (DESIGNER)}+0.99\right\}+1$ (1)(2) | STR. | | | | | | | | | | | |
| F___01 | | DESIGNER (2) | | IA-200 | | $\left\{\frac{EB-150}{REQ.\ SPA.\ (DESIGNER)}+0.99\right\}+1$ (1)(2) | STR. | | | | | | | | | | | |
| F1502 | 15 | | | EB-200 | | $\left\{\frac{IA-200}{450}+0.99\right\}+1$ (1) | STR. | | | | | | | | | | 1.570 | |
| F1003 | 10 | | 550 | | | $\left(\left\{\frac{IA-200}{950}+0.99\right\}+1\right)\left(\left\{\frac{EB-150}{950}+0.99\right\}+1\right)$ (1) | ② | 125 | 300 | 125 | 75 | | | | | | 0.785 | |
| F1504 | 15 | | 875 | | | $\left\{\frac{EB-150}{450}+0.99\right\}+1$ (1) | STR. | | | | | | | | | | 1.570 | |
| EF___05 | | DESIGNER (2) | | HB+350+A<br>FOR "A" VARIABLE SEE TABLE 1 | | $\left\{\frac{EB-150(TAN(AA))-150(TAN(AB))}{REQ.\ SPA.\ (DESIGNER)}+0.99\right\}+1$ (1)(2) | ① | | | | | | | SEE TABLE 1<br>(B = HB + 350) | | | | |

### FOOTNOTES FOR TABLE

(1) TAKE THE INTEGER VALUE OF THE QUANTITY WITHIN THE { }

(2) DESIGN ABUTMENT AND RETAINING WALLS IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS. USE DATA ASSEMBLY AND CONSTRUCTION SHEETS TO CALCULATE THE NECESSARY DIMENSIONS AND REINFORCEMENT FOR THE ABUTMENT (WITHOUT BACKWALL), WINGWALLS, AND SPREAD FOOTING.

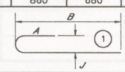
(3) TAKE THE ABSOLUTE VALUE OF THE QUANTITY WITHIN THE | |

(4) USE TABLE 1 ON THIS SHEET TO COMPLETE BAR MASS QUANTITIES.

(5) TOTAL BAR MASS = (BAR LENGTH OR AVERAGE BAR LENGTH)(TOTAL NO. OF BARS)(BAR MASS)

### TABLE 1
### REINFORCEMENT INFORMATION

| BAR SIZE | RECOMMENDED END HOOK DIMENSIONS (ALL GRADES) 180° HOOKS | | BAR MASS |
|---|---|---|---|
| | A | J | kg/m |
| 10 | 150 | 90 | 0.785 |
| 15 | 180 | 130 | 1.570 |
| 20 | 220 | 160 | 2.355 |
| 25 | 280 | 200 | 3.925 |
| 30 | 400 | 300 | 5.495 |
| 35 | 470 | 360 | 7.850 |
| 45 | 670 | 530 | 11.775 |
| 55 | 860 | 680 | 19.625 |




| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

SPREAD FOOTING ABUTMENT ____ W/O WINGWALLS

PREPARED BY:

POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA



ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 10 | DATA ASSEMBLY SHEETS |

## CONTROL DIMENSIONS

| CODE | DESCRIPTION | | SOURCE | | VALUE |
|---|---|---|---|---|---|
| A1 | SKEW ANGLE | | A1 | (1) | DEG. |
| A2 | % GRADE (LOOKING STATIONS AHEAD) | | A2 | (1) | |
| C1 | CURB TO CURB ROADWAY WIDTH (NORMAL) | | C1 | (1) | |
| C2 | DECK WIDTH OUT TO OUT | | C2 | (1) | |
| A | DECK OR LONG. PANEL THICKNESS | | USE E1 FOR GLULAM & STEEL BEAM OR E2 FOR LONG. PANEL | (1) | |
| B | BEAM DEPTH | | USE L4 FOR GLULAM BEAM, L5 FOR STEEL BEAM OR ZERO (0) FOR LONG. PANEL | (1) | |
| C | BEARING PAD THICKNESS | | USE N3 OR P3 FOR GLULAM AND STEEL BEAM OR TWENTY (20) FOR LONG. PANEL | (1) | |
| AA | WINGWALL "A" SKEW ANGLE | | DESIGNER (15°00'00" MIN., 45°00'00" MAX.) | (2) | DEG. |
| AB | WINGWALL "B" SKEW ANGLE | | DESIGNER (15°00'00" MIN., 45°00'00" MAX.) | (2) | DEG. |
| AC | WINGWALL "A" LENGTH | | DESIGNER | (2) | |
| AD | WINGWALL "B" LENGTH | | DESIGNER | (2) | |
| BA | WINGWALL "A" CORNER DIMENSIONS | | $300+\left(\frac{375}{TAN(A1)}\right)+375\left(TAN\left(\frac{AA}{2}\right)\right)$ | | |
| BB | WINGWALL "A" CORNER DIMENSIONS | | $375\left(TAN\left(\frac{AA}{2}\right)\right)+\left(\frac{76}{TAN(AA)}\right)+100(COS(AA))$ | | |
| CA | WINGWALL "B" CORNER DIMENSIONS | | $300-\left(\frac{375}{TAN(A1)}\right)+375\left(TAN\left(\frac{AB}{2}\right)\right)$ | | |
| IF CA $\geq$ 150 USE CONDITION 1 EQUATIONS, OTHERWISE USE CONDITION 2 EQUATIONS | | | | | |
| CONDITION 1 EQUATIONS | | | | | |
| CA | WINGWALL "B" CORNER DIMENSIONS | | AS CALCULATED ABOVE | | |
| CB | WINGWALL "B" CORNER DIMENSIONS | | $375\left(TAN\left(\frac{AB}{2}\right)\right)+\left(\frac{76}{TAN(AB)}\right)+100(COS(AB))$ | | |
| CC | WINGWALL "B" CORNER DIMENSIONS | | 300 | | |
| CONDITION 2 EQUATIONS | | | | | |
| CA | WINGWALL "B" CORNER DIMENSIONS | | 300 | | |
| CB | WINGWALL "B" CORNER DIMENSIONS | | $375\left(TAN\left(\frac{AB}{2}\right)\right)+\left(\frac{76}{TAN(AB)}\right)+100(COS(AB))$ | | |
| CC | WINGWALL "B" CORNER DIMENSIONS | | $300+\left(\frac{450}{TAN(A1)}\right)-375\left(TAN\left(\frac{AB}{2}\right)\right)$ | | |
| DA | WINGWALL "A" OUT TO OUT PILE DIMENSION | TIMBER PILE ABUT. | $AC-150+\left(\frac{150}{TAN(AA)}\right)-\left(\frac{254}{TAN(AA)}\right)$ | | |
| DB | WINGWALL "B" OUT TO OUT PILE DIMENSION | TIMBER PILE ABUT. | $AD-150+\left(\frac{150}{TAN(AB)}\right)-\left(\frac{254}{TAN(AB)}\right)$ | | |
| EA | ABUTMENT LENGTH | TIMBER PILE ABUT. | $300+150(TAN(AA))-\left(\frac{150}{SIN(AA)COS(AA)}\right)+\left(\frac{254}{TAN(AA)}\right)$ | | |
| EB | ABUTMENT LENGTH | TIMBER PILE ABUT. | $CC+150(TAN(AB))-\left(\frac{150}{SIN(AB)COS(AB)}\right)+\left(\frac{254}{TAN(AB)}\right)$ | | |
| DA | WINGWALL "A" OUT TO OUT PILE DIMENSION | STEEL PILE ABUT. | $AC-150+\left(\frac{150}{SIN(AA)}\right)-\left(\frac{DC}{TAN(AA)}\right)-\left(\frac{199}{TAN(AA)}\right)$ | | |
| DB | WINGWALL "B" OUT TO OUT PILE DIMENSION | STEEL PILE ABUT. | $AD-150+\left(\frac{150}{SIN(AB)}\right)-\left(\frac{DD}{TAN(AB)}\right)-\left(\frac{199}{TAN(AB)}\right)$ | | |
| DC | WINGWALL "A" PILE OFFSET | STEEL PILE ABUT. | 178(COS(46.1−AA))−123 | | |
| DD | WINGWALL "B" PILE OFFSET | STEEL PILE ABUT. | 178(COS(46.1−AB))−123 | | |
| EA | ABUTMENT LENGTH | STEEL PILE ABUT. | $300+150(TAN(AA))-\left(\frac{150}{SIN(AA)COS(AA)}\right)+\left(\frac{DC}{SIN(AA)}\right)+\left(\frac{199}{SIN(AA)}\right)+\left(\frac{K3}{SIN(A1)}\right)+\left(\frac{150}{TAN(A1)}\right)$ | | |
| EB | ABUTMENT LENGTH | STEEL PILE ABUT. | $CC+150(TAN(AB))-\left(\frac{150}{SIN(AB)COS(AB)}\right)+\left(\frac{DD}{SIN(AB)}\right)+\left(\frac{199}{SIN(AB)}\right)+\left(\frac{K3}{SIN(A1)}\right)-\left(\frac{150}{TAN(A1)}\right)$ | | |
| EC | ABUTMENT LENGTH | | $\left(\frac{C2}{(2)SIN(A1)}\right)+EA$ | | |
| ED | ABUTMENT LENGTH | | $\left(\frac{C2}{(2)SIN(A1)}\right)+EB$ | | |
| EE | TIMBER BEARING SILL LENGTH | | $\left(\frac{C2}{SIN(A1)}\right)+EA+EB+600$ | | |
| EF | NUMBER OF PILES (ABUTMENT) | | DESIGNER | (3) | |
| EG | PILE SPACING (ABUTMENT) | | $\frac{EF}{EC+ED}$ | | |
| FA | NUMBER OF PILES (WINGWALL "A") | | DESIGNER | (3) | |
| FB | PILE SPACING (WINGWALL "A") | | $\left(\frac{DA}{FA}\right)$ | | |
| GA | NUMBER OF PILES (WINGWALL "B") | | DESIGNER | (3) | |
| GB | PILE SPACING (WINGWALL "B") | | $\left(\frac{DB}{GA}\right)$ | | |
| HA | CHANGE IN WINGWALL "A" HEIGHT | | (20 − 22)1000 | | |
| HB | CHANGE IN WINGWALL "B" HEIGHT | | (30 − 32)1000 | | |
| IA | WINGWALL "A" SLOPE | | $10\left(\frac{HA}{AC}\right)$ | | |
| IB | WINGWALL "B" SLOPE | | $10\left(\frac{HB}{AD}\right)$ | | |
| JA | WINGWALL "A" COPING LENGTH | | $\left(\frac{(10^2+IA^2)^{0.5}}{10}\right)(AC+150)$ | | |
| JB | WINGWALL "B" COPING LENGTH | | $\left(\frac{(10^2+IB^2)^{0.5}}{10}\right)(AD+150)$ | | |
| KA | EXPOSED ABUTMENT HEIGHT | | ((11 − 14)1000)−350 | | |
| LA | WINGWALL "A" CAP PLATE LENGTH | STEEL PILE ABUT. | $\left(\frac{(10^2+IA^2)^{0.5}}{10}\right)(256)$ | | |
| LB | WINGWALL "B" CAP PLATE LENGTH | STEEL PILE ABUT. | $\left(\frac{(10^2+IB^2)^{0.5}}{10}\right)(256)$ | | |

## CONTROL STATIONS AND ELEVATIONS

| CODE | DESCRIPTION | SOURCE | | VALUE (m) |
|---|---|---|---|---|
| 10 | ABUTMENT ELEVATION | USE 1 FOR ABUT. 1, OR 2 FOR ABUT. 2 | (1) | |
| 11 | ABUTMENT ELEVATION | $10-\left(40-\frac{C1}{2}(0.02)-A-B-C-12\right)\left(\frac{m}{1*10^3mm}\right)$ | | |
| 12 | ABUTMENT ELEVATION | $11+\frac{A2}{100}\left(\frac{C2}{2(TAN(A1))}\right)\left(\frac{m}{1*10^3mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | $11-\frac{A2}{100}\left(\frac{C2}{2(TAN(A1))}\right)\left(\frac{m}{1*10^3mm}\right)$ | ABUTMENT 2 | |
| 13 | ABUTMENT ELEVATION | $11-\frac{A2}{100}\left(\frac{C2}{2(TAN(A1))}\right)\left(\frac{m}{1*10^3mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | $11+\frac{A2}{100}\left(\frac{C2}{2(TAN(A1))}\right)\left(\frac{m}{1*10^3mm}\right)$ | ABUTMENT 2 | |
| 14 | SCOUR DEPTH | DESIGNER (SEE DM-4, PART A, CHAPTER 7 FOR SCOUR REQ.) | | |
| 15 | ABUTMENT PILE TIP ELEVATION | DESIGNER | | |
| 20 | WINGWALL "A" ELEVATION | $10-\left(\frac{A2}{100}\left(\frac{C2}{2(TAN(A1))}\right)-\frac{C1}{2}(0.02)-A\right)\left(\frac{m}{1*10^3mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | $10+\left(\frac{A2}{100}\left(\frac{C2}{2(TAN(A1))}\right)-\frac{C1}{2}(0.02)-A\right)\left(\frac{m}{1*10^3mm}\right)$ | ABUTMENT 2 | |
| 21 | WINGWALL "A" ELEVATION | DESIGNER (SEE WINGWALL EXAMPLE) | | |
| 22 | WINGWALL "A" ELEVATION | $21+150\left(\frac{m}{1*10^3mm}\right)$ | | |
| 23 | WINGWALL "A" PILE TIP ELEVATION | DESIGNER | | |
| 30 | WINGWALL "B" ELEVATION | $10+\left(\frac{A2}{100}\left(\frac{C2}{2(TAN(A1))}\right)-\frac{C1}{2}(0.02)-A\right)\left(\frac{m}{1*10^3mm}\right)$ | ABUTMENT 1 | |
| | (USE APPROPRIATE EQUATION DEPENDING ON ABUTMENT NO.) | $10-\left(\frac{A2}{100}\left(\frac{C2}{2(TAN(A1))}\right)-\frac{C1}{2}(0.02)-A\right)\left(\frac{m}{1*10^3mm}\right)$ | ABUTMENT 2 | |
| 31 | WINGWALL "B" ELEVATION | DESIGNER (SEE WINGWALL EXAMPLE) | | |
| 32 | WINGWALL "B" ELEVATION | $21+150\left(\frac{m}{1*10^3mm}\right)$ | | |
| 33 | WINGWALL "B" PILE TIP ELEVATION | DESIGNER | | |

**FOOTNOTES FOR TABLES**

(1) SEE APPROPRIATE SUPERSTRUCTURE DATA ASSEMBLY SHEETS (101M SHEETS 1 THRU 4).

(2) SEE SHEET 12 OF 101M FOR WINGWALL EXAMPLE.

(3) DESIGN PILES IN ACCORDANCE WITH 100M SHEET 2.

| Mark | Description | By | Chk'd | App'd | Date |
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| | | | | | |

REVISIONS

PREPARED BY:

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STATE COLLEGE, PA



ENGINEER'S SEAL

# PILE SUPPORTED TIMBER SILL

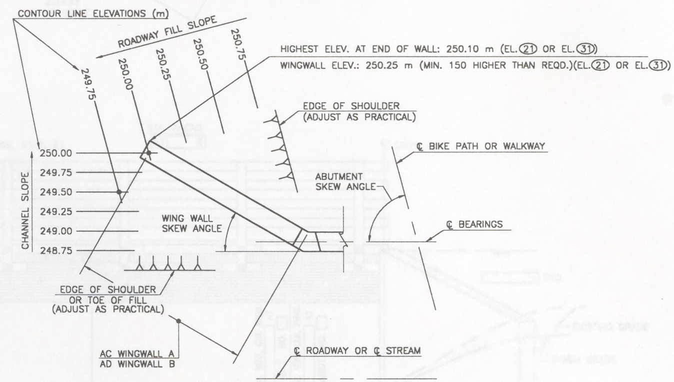
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 11 | DATA ASSEMBLY SHEETS |

SHEET____of____

## QUANTITIES

| ITEM | | QUANTITY FORMULA | UNIT | SUBTOTAL | TOTAL |
|---|---|---|---|---|---|
| CLASS 3 EXCAVATION | | DESIGNER | $m^3$ | | |
| TIMBER BEARING SILL | | $\left(EE(300)(350)\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| ABUTMENT | PILES | $(EF)\left(11 - 350 - 15\right)\left(\frac{m}{1*10^3 mm}\right)$ | m | | |
| WINGWALL A | PILES | $(FA-1)\left(\frac{2}{3}(HA) + 22 - 23\right)\left(\frac{m}{1*10^3 mm}\right)$ | m | | |
| WINGWALL B | PILES | $(GA-1)\left(\frac{2}{3}(HB) + 32 - 33\right)\left(\frac{m}{1*10^3 mm}\right)$ | m | | |
| ABUTMENT | TIMBER LAGGING | $EE(76)(KA+915)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| WINGWALL A | TIMBER LAGGING | $(DA+450)(76)\left(\frac{2}{3}(HA) + 22 - 14 + 915\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| WINGWALL B | TIMBER LAGGING | $(DB+450)(76)\left(\frac{2}{3}(HB) + 32 - 14 + 915\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| WINGWALL A COPING | | $130(375)\left(JA + \frac{1}{2}\left(BA+BB+300+\frac{76}{TAN(AA)} + 100(COS(AA))\right)\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| WINGWALL B COPING | | $130(375)\left(JB + \frac{1}{2}\left(CA+CB+CC+\frac{76}{TAN(AB)} + 100(COS(AB))\right)\right)\left(\frac{m^3}{1*10^9 mm^3}\right)$ | $m^3$ | | |
| SELECTED BORROW EXCAVATION, STRUCTURE BACKFILL | | DESIGNER | $m^3$ | | |
| PILE TIP REINFORCEMENT | | EF+FA+GA-2 | EA | | |

IN GENERAL, PROVIDE WINGWALLS OF SUFFICIENT LENGTH TO RETAIN THE ROADWAY EMBANKMENT TO THE REQUIRED EXTENT AND TO FURNISH PROTECTION AGAINST EROSION COMPUTE WINGWALL LENGTHS USING THE ACTUAL CONDITION AT THE SITE. THE FOLLOWING METHOD IS PROPOSED TO COMPUTE THE REQUIRED LENGTHS.




WINGWALL EXAMPLE

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
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REVISIONS

PILE SUPPORTED TIMBER SILL

ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 101M | 12 | DATA ASSEMBLY SHEETS |

SHEET___of___

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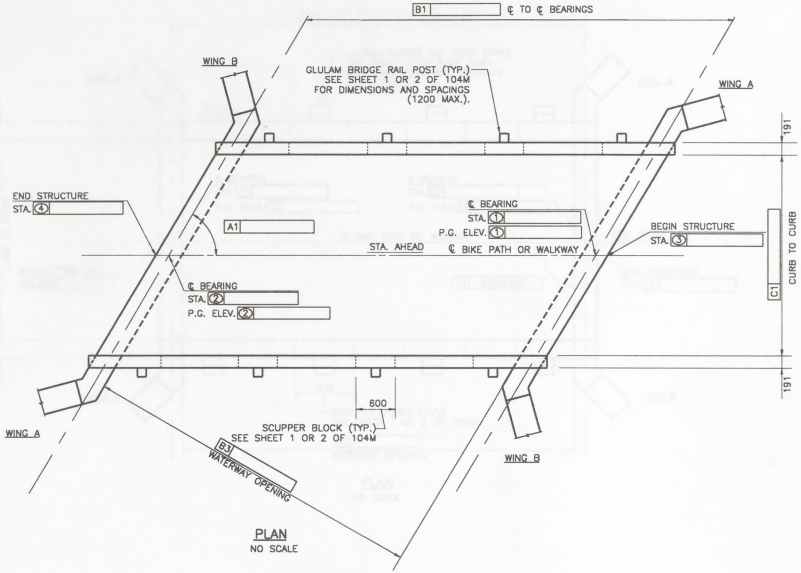


PLAN
NO SCALE

## INDEX OF DRAWINGS

| SHT. NO. | TITLE | SHT. NO. | TITLE |
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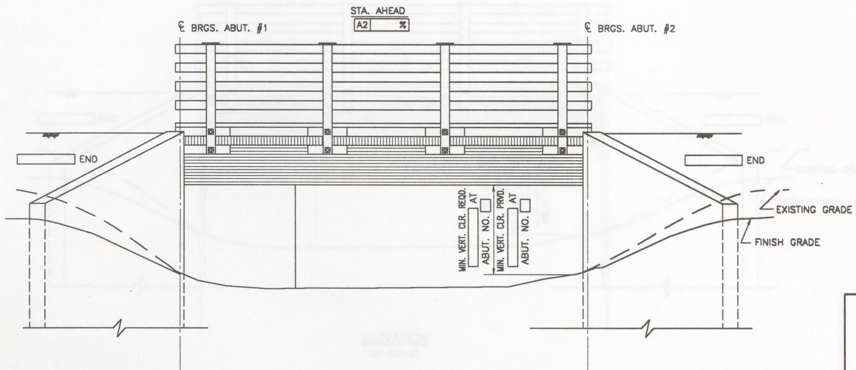


ELEVATION
NO SCALE

HYDRAULIC DATA
(DESIGNER)

DRAINAGE AREA –
DESIGN FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –
100 YEAR FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
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REVISIONS

GENERAL PLAN & ELEVATION – LEFT SKEW

ENGINEERING SEAL

SIGNATURE & DATE

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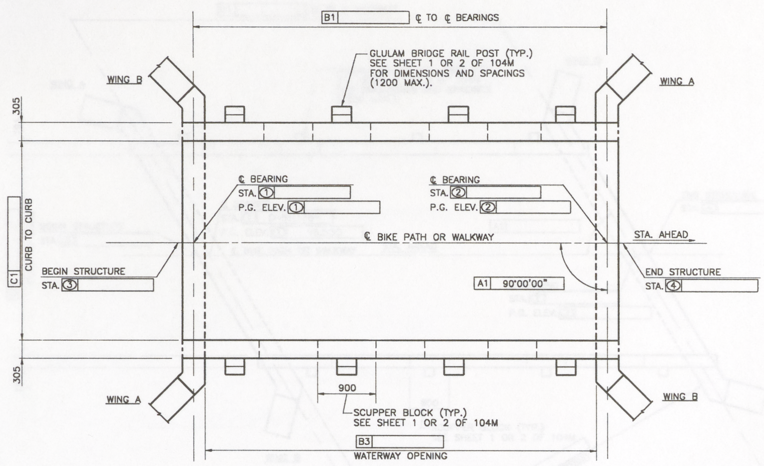
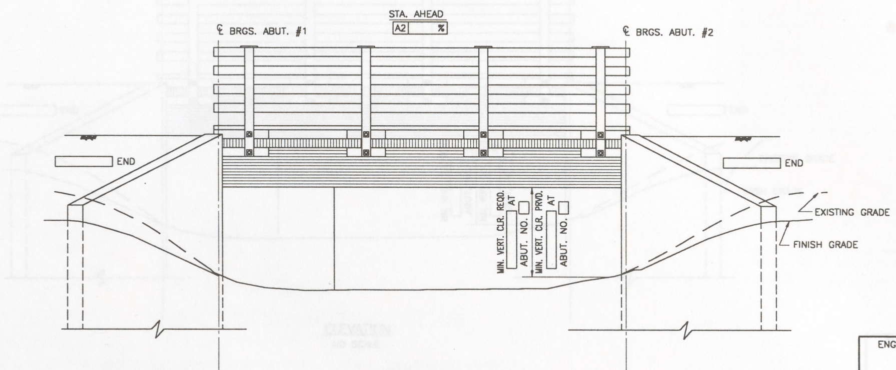
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 1 | GLULAM BEAM SUPERSTRUCTURE |

SHEET____of____




PLAN
NO SCALE




ELEVATION
NO SCALE

INDEX OF DRAWINGS

| SHT. NO. | TITLE | SHT. NO. | TITLE |
|---|---|---|---|
| | | | |

HYDRAULIC DATA
(DESIGNER)

DRAINAGE AREA –
DESIGN FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –
100 YEAR FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
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REVISIONS

GENERAL PLAN & ELEVATION – 90° SKEW

ENGINEERING SEAL

SIGNATURE & DATE

PREPARED BY:

SERIES NO: 102M

SHEET NO: 2

SERIES TITLE: GLULAM BEAM SUPERSTRUCTURE

SHEET___of___

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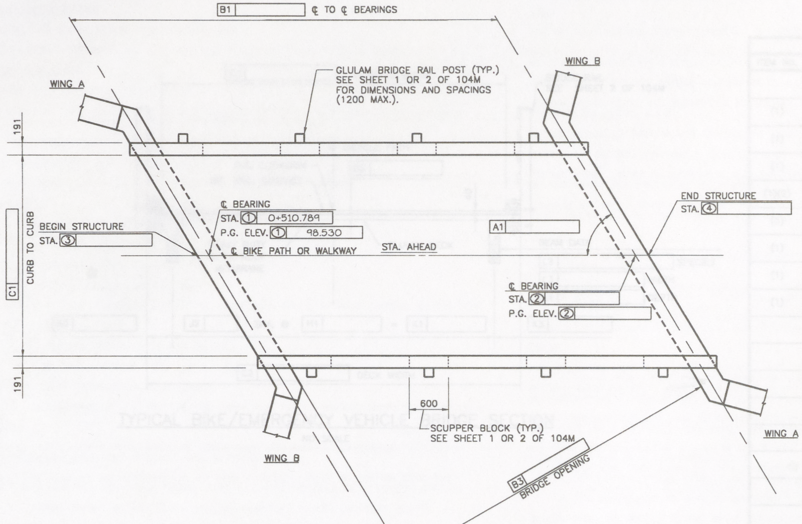
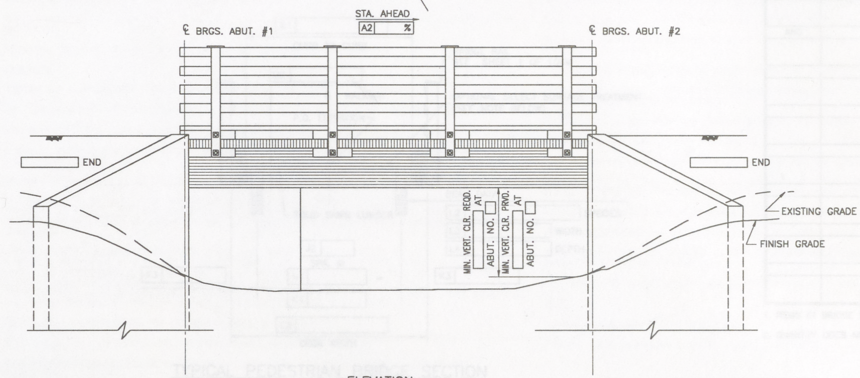



PLAN
NO SCALE




ELEVATION
NO SCALE

## INDEX OF DRAWINGS

| SHT. NO. | TITLE | SHT. NO. | TITLE |
|---|---|---|---|
| | | | |

## HYDRAULIC DATA
(DESIGNER)

DRAINAGE AREA –
DESIGN FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –
100 YEAR FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

GENERAL PLAN & ELEVATION – RIGHT SKEW

ENGINEERING SEAL

SIGNATURE & DATE

PREPARED BY:

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SERIES NO: 102M

SHEET NO: 3

SERIES TITLE: GLULAM BEAM SUPERSTRUCTURE

SHEET____of____

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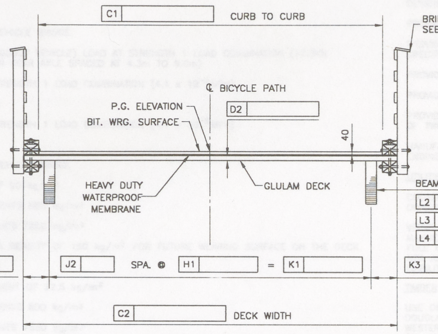
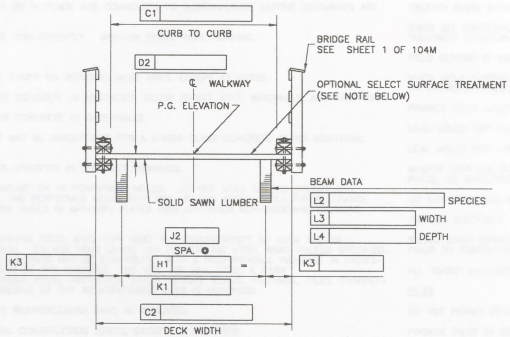



## TYPICAL BIKE/EMERGENCY VEHICLE BRIDGE SECTION

NO SCALE




## TYPICAL PEDESTRIAN BRIDGE SECTION

NO SCALE

NOTE: SELECT SURFACE TREATMENT IS PERCOL ELASTIC CEMENT (MICROSURFACING) BY E.J. BRENEMAN, INC. (610-678-9691) OR AN APPROVED EQUAL. (10 mm THICK MAX.)

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APPROXIMATE QUANTITIES – BRIDGE STRUCTURE, AS DESIGNED

| ITEM NO. | ITEM | UNIT | ABUT. 1 | ABUT. 2 | SUPERSTRUCTURE | TOTAL |
|---|---|---|---|---|---|---|
| | BRIDGE STRUCTURE AS DESIGNED | LS | | | | LS |
| (1) | GLUE LAMINATED TIMBER BEAMS | $m^3$ | ----- | ----- | | |
| (1) | GLUE LAMINATED TIMBER | $m^3$ | ----- | ----- | | |
| (1) | SOLID SAWN TIMBER | $m^3$ | ----- | ----- | | |
| (1)(2) | BEARING PLATE ASSEMBLIES | kg | ----- | ----- | | |
| (1) | SELECT SURFACE TREATMENT | kg | ----- | ----- | | |
| (1) | 152 um POLYURETHANE | $m^2$ | ----- | ----- | | |
| (1) | HEAVY DUTY WATERPROOF MEMBRANE | $m^2$ | ----- | ----- | | |
| (1) | BITUMINOUS WEARING COURSE | kg | ----- | ----- | | |
| AND | | | | | | |

1. ITEMS IN BRIDGE STRUCTURE LUMP SUM ITEM GIVEN FOR INFORMATION ONLY.
2. QUANTITY DOES NOT INCLUDE ANY CONNECTION HARDWARE

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ENGINEER'S SEAL

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

TYPICAL SECTION & QUANTIES

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 4 | GLULAM BEAM SUPERSTRUCTURE |

SHEET____of____

## GENERAL NOTES:

### DESIGN SPECIFICATIONS

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (1994)

DESIGN IS IN ACCORDANCE WITH THE LOAD AND RESISTANCE FACTOR DESIGN METHOD.

### DESIGN LIVE LOADS

TYPICAL BIKE/EMERGENCY VEHICLE BRIDGE

H DESIGN TRUCK (EMERGENCY VEHICLE) LOAD AT STRENGTH 1 LOAD COMBINATION (17.2KN FRONT AXLE AND 71.2KN REAR AXLE SPACED AT 4.3m TO 9.0m)

PEDESTRIAN LOAD AT STRENGTH 1 LOAD COMBINATION (4.1 x $10^{-3}$ MPa)

TYPICAL PEDESTRIAN BRIDGE

PEDESTRIAN LOAD AT STRENGTH 1 LOAD COMBINATION (4.1 x $10^{-3}$ MPa)

### DEAD LOADS

TYPICAL BIKE/EMERGENCY VEHICLE BRIDGE

BITUMINOUS SURFACE OF 90 $kg/m^2$

TIMBER BRIDGE COMPONENTS 800 $kg/m^3$

STEEL BRIDGE COMPONENTS 7850 $kg/m^3$

INCLUDES SURFACE AREA DENSITY OF 150 $kg/m^2$ FOR FUTURE WEARING SURFACE ON THE DECK.

TYPICAL PEDESTRIAN BRIDGE

SELECT SURFACE TREATMENT OF 22.5 $kg/m^2$

TIMBER BRIDGE COMPONENTS 800 $kg/m^3$

STEEL BRIDGE COMPONENTS 7850 $kg/m^3$

INCLUDES SURFACE AREA DENSITY OF 150 $kg/m^2$ FOR FUTURE WEARING SURFACE ON THE DECK.

### GENERAL

PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH AASHTO/AWS/DI.5-88 BRIDGE WELDING CODE, AND CONTRACT SPECIAL PROVISIONS.

NOTIFY THE REGIONAL HEADQUARTERS OF THE FISH COMMISSION PRIOR TO CONSTRUCTION AND COOPERATE WITH FISH COMMISSION DURING CONSTRUCTION OF BRIDGES OVER FISHABLE STREAMS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL AND IN MILLIMETERS UNLESS OTHERWISE NOTED.

SUPERSTRUCTURE DIMENSIONS SHOWN ARE FOR NORMAL TEMPERATURE OF 20° C.

SPREAD FOOTINGS MAY BE ORDERED BY THE ENGINEER TO BE AT ANY ELEVATION OR OF ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION.

THE SUPERSTRUCTURE MUST BE IN PLACE AND CONNECTED TO SUBSTRUCTURE BEFORE ABUTMENTS ARE BACKFILLED.

BACK FILL BOTH ABUTMENTS CONCURRENTLY. MAINTAIN SYMMETRICAL LOADING.

### CONCRETE

PROVIDE 50 mm CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.

USE CLASS 20.7MPa CEMENT CONCRETE IN ABUTMENTS BELOW BRIDGE SEAT, WINGWALLS, AND FOOTINGS.

USE CLASS 24.1MPa CEMENT CONCRETE IN CHEEKWALLS.

A HIGHER CLASS CONCRETE MAY BE SUBSTITUTED FOR A LOWER CLASS CONCRETE AT NO ADDITIONAL COST TO THE OWNER.

PREPARE BEARING AREAS AS SPECIFIED IN CONTRACT DRAWINGS.

SET ANCHOR BOLTS TO TEMPLATE OR IN PERFORMED HOLES. DO NOT DRILL UNLESS SPECIFICALLY INDICATED ON PLANS. FILL THE PERFORMED HOLES WITH NON-SHRINK GROUT. FILL THE CLEARANCE BETWEEN ANCHOR BOLTS AND HOLES IN MASONRY PLATES WITH APPROVED NONHARDENING CAULKING COMPOUND.

PROVIDE GRADE 400 REINFORCING STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A 615M, A 616M, A 617M AND A 706M. DO NOT WELD GRADE 400 REINFORCING STEEL BARS UNLESS SPECIFIED. GRADE 300 REINFORCING STEEL BARS MAY BE SUBSTITUTED WITH A PROPORTIONAL INCREASE IN CROSS-SECTIONAL AREA, IF APPROVED BY THE ENGINEER. DO NOT USE RAIL STEEL A 616M REINFORCEMENT BARS IN BRIDGE PIERS, ABUTMENTS, SHEAR BLOCKS, BEAMS, FOOTINGS, PILES, PARAPETS AND WHERE BENDING OR WELDING OF THE REINFORCEMENT BARS IS INDICATED.

EPOXY-COAT SUBSTRUCTURE REINFORCEMENT BARS AS INDICATED.

RAKE-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS INDICATED.

REINFORCEMENT BAR SCHEDULE IS FOR INFORMATION ONLY. VERIFY IT PRIOR TO BIDDING AND FABRICATION.

PLACE CHEEKWALL CONCRETE AFTER BEAMS ARE SET IN POSITION.

CHAMFER EXPOSED CONCRETE EDGES 25 mm BY 25 mm, EXCEPT AS NOTED.

PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH OF 30 DIAMETERS OR IN ACCORDANCE WITH ASSHTO SECTION A5.11 AND D5.11, WHICHEVER IS GREATER.

## GENERAL NOTES CONTINUED:

### STEEL

HOT DIP GALVANIZE ALL TIMBER CONNECTION HARDWARE.

PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270, GRADE 250 (ASTM A709M, GRADE 250) DESIGNATION, EXCEPT WHEN NOTED OTHERWISE.

PROVIDE BOLTS AND LAG SCREWS CONFORMING TO ASTM A307 DESIGNATION, EXCEPT WHEN NOTED OTHERWISE.

PROVIDE BOLTS, NUTS, AND WASHERS IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATION SECTION 6.4.3.

PROVIDE MALLEABLE IRON WASHER CONFORMING TO ASTM A47M, GRADE 24118.

PROVIDE LAG SCREWS CONFORMING TO ANSI B18.2.1 - 1981.

PROVIDE WOOD SCREWS IN ACCORDANCE WITH ANSI/ASME B18.6.1. WITH A MINIMUM THREADED PORTION OF TWO-THIRDS THE LENGTH OF THE SHAFT.

MANUFACTURE SHEAR PLATE CONNECTORS FROM PRESSED STEEL MEETING SOCIETY OF AUTOMOTIVE ENGINEERS SPECIFICATION SAE-1010 OR AN APPROVED EGUAL.

### UTILITIES

COORDINATE THE REQUIREMENTS FOR PROTECTION AND/OR RELOCATION OF UTILITIES WITH THE UTILITY OWNER PRIOR TO STARTING WORK.

VERIFY AND LOCATE ALL EXISTING UTILITIES PRIOR TO STARTING WORK; CONDUCT OPERATIONS IN A MANNER WHICH ENSURES THAT THE UTILITIES WILL NOT BE DISTURBED OR ENDANGERED, AND ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE TO UTILITIES DURING CONSTRUCTION. THE DEPARTMENT DOES NOT ASSUME RESPONSIBILITY FOR REIMBURSEMENT, PARTICIPATION IN DESIGN AND/OR REVISIONS, OR LIABILITY FOR ACCURACY OF TYPE, SIZE, AND LOCATION OF ANY UTILITY.

### TIMBER

USE ONLY GLUE LAMINATED TIMBER FABRICATED WITH EITHER SOUTHERN PINE, RED MAPLE OR DOUGLAS FIR LUMBER GRADED PER NORTHEASTERN LUMBER MANUFACTURER'S ASSOCIATION (RED MAPLE) WESTERN WOOD PRODUCTS ASSOCIATION (DOUGLAS FIR) OR SOUTHERN PINE INSPECTION BUREAU (SOUTHERN PINE) STANDARDS AND MANUFACTURED FOLLOWING AITC 119, AITC 117 OR CURRENT SPECIFICATIONS.

PROVIDE MINIMUM WET-USE BASE RESISTANCES AND MOE VALUES IN ACCORDANCE WITH SHEET 2 OF 100M. USE GRADE NO. 2 OR BETTER FOR SOLID SAWN LUMBER.

ALL SAWN LUMBER SHALL BE TREATED IN ACCORDANCE WITH THE REQUIREMENTS OF AWPA STANDARD C14 WITH ONE OF THE FOLLOWING PRESERVATIVES:

A. CREOSOTE CONFORMING TO AWPA STANDARD P1
B. PENTACHLOROPHENOL CONFORMING TO AWPA STANDARD P8 IN HYDROCARBON SOLVENT, TYPE A, CONFORMING TO AWPA STANDARD P9
C. CCA CONFORMING TO AWPA STANDARD P5

GLULAM SHALL BE TREATED TO THE ABOVE REQUIREMENTS WITH CREOSOTE OR PENTACHLOROPHENOL.

TREATED MATERIAL SHALL BE FREE OF EXCESS PRESERVATIVES ON THE WOODS SURFACE. THE TREATING PROCESS FOR THESE PRESERVATIVES SHALL INCLUDE AN EXPANSION BATH, STEAMING AND/OR DRIPPING TO ENSURE THAT THE PRESERVATIVE WILL NOT BLEED.

TREATED WOOD SHALL BE INSPECTED AND CERTIFIED IN ACCORDANCE WITH AWPA STANDARD M2.

TREAT ALL ABRASIONS AND CUTS MADE IN THE FIELD WITH THREE BRUSH COATS OF THE FIELD TREATMENT SOLUTION.

FIELD CUTTING IS NOT PERMITTED UNLESS APPROVED BY THE ENGINEER.

WHEN FIELD CUTTING, TREAT WITH BITUMINOUS ASPHALT BASED ROOF CEMENT, COPPER NAPHTHENATE PASTE, OR AN APPROVED PRESERVATIVE SYSTEM.

PROVIDE PILOT HOLES FOR LAG SCREWS IN RANGE OF (0.60)D TO (0.70)D

LEAD HOLES FOR LAG SCREWS WITH D< 12.7mm ARE D+ 0.8mm

LEAD HOLES FOR LAG SCREWS WITH D> 12.7mm ARE D+ 1.6mm

ALWAYS COAT LAG SCREW THREADS WITH BITUMINOUS ASPHALT BASED ROOF CEMENT, COPPER NAPHTHENATE PASTE, OR APPROVED PRESERVATIVE SYSTEM BEFORE INSTALLING LAG SCREW.

DO NOT DRIVE LAG SCREW WITH HAMMER. SCREW OR TORQUE LAG SCREWS.

PROVIDE SUFFICIENT LAG SCREW LENGTH SO LAG SCREW SHANK WILL PENETRATE RECEIVING MEMBER.

SUBMIT SHOP DRAWINGS SHOWING DETAILS OF ALL GLULAM CONSTRUCTION FOR APPROVAL TO THE ENGINEER PRIOR TO FABRICATION OPERATIONS.

ALL TIMBER DIMENSIONS SHOWN ARE ACTUAL UNLESS OTHERWISE NOTED.

### PILES

DO NOT PERMIT SPLICES IN PILES.

PROVIDE PILES IN ACCORDANCE WITH SHEET 2 OF 100M.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| REVISIONS | | | | | |

GENERAL NOTES

PREPARED BY:
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CONSULTING ENGINEERS
STATE COLLEGE, PA

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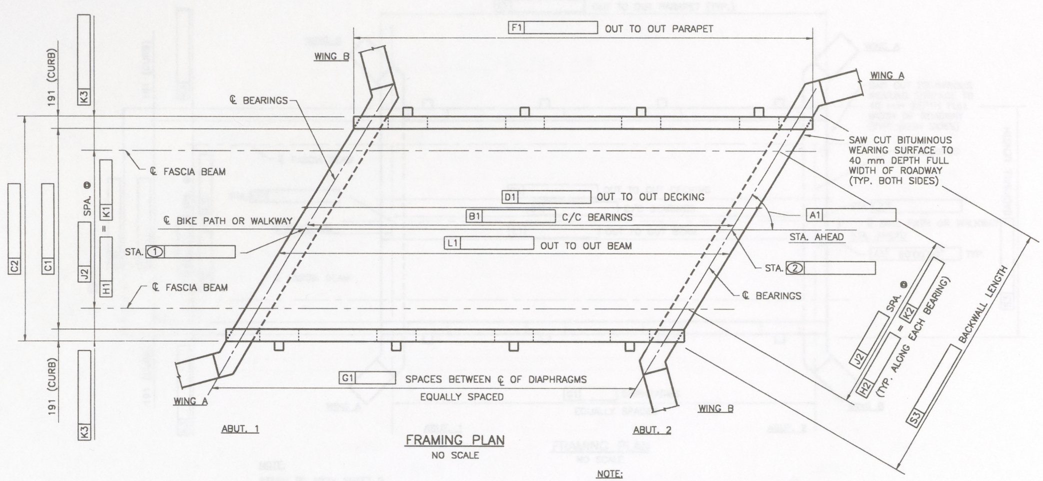
ENGINEER'S SEAL

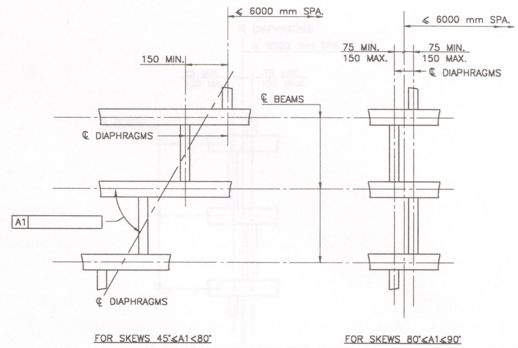
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 5 | GLULAM BEAM SUPERSTRUCTURE |

SHEET____of____




FRAMING PLAN
NO SCALE

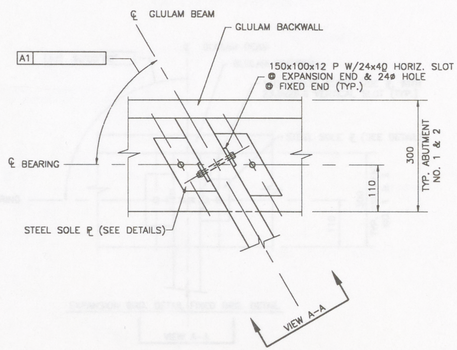
NOTE:
REFER TO 102M SHEET 9 OR FOR SUPERSTRUCTURE DETAILS



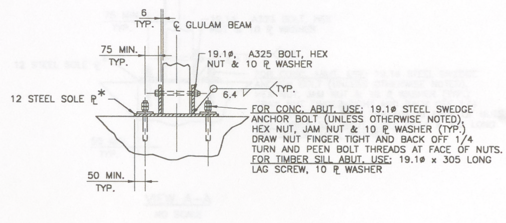

DIAPHRAGM PLACEMENT DETAIL
NO SCALE

## NOTES:

1. PROVIDE MECHANICALLY GALVANIZED SWEDGE OF APPROVED TYPE OF ANCHOR BOLTS. SET IN THE MASONRY AS SHOWN ON THE DESIGN DRAWINGS.
2. PROVIDE MINIMUM SIZE WELD IN ACCORDANCE WITH AASHTO/AWS CODE UNLESS LARGER WELD IS REQUIRED BY DESIGN.
3. PROVIDE PLATE WASHERS OF SUFFICIENT SIZE TO COVER THE ROUND HOLE OR SLOT FOR EXTREMES OF MOVEMENT OF THE BEARINGS. WASHER MAY BE CLIPPED IF REQUIRED.
4. FILL ANCHOR BOLT OR LAG SCREW SOLE PLATE HOLES WITH NON-HARDENING CAULKING COMPOUND AT THE FIXED END.
5. PERMIT DRILLING OF ANCHOR BOLT HOLES AT ABUTMENT ONLY. WASH AND DRY HOLE BEFORE FILLING WITH NON-SHRINK GROUT.
6. BLAST CLEAN CONCRETE BEARING SURFACES TO ACHIEVE ROUGH TEXTURE IF REQUIRED.

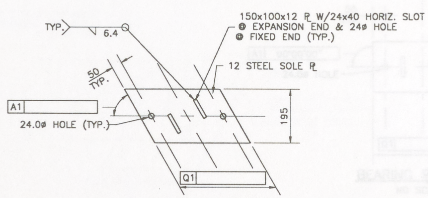



BEARING PLATE DETAIL
NO SCALE




VIEW A–A
NO SCALE

* SLOPE BEAM SEAT PARALLEL TO BOTTOM OF BEAM




BEARING PLATE DETAIL
NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

FRAMING PLAN – LEFT SKEW

PREPARED BY:
POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

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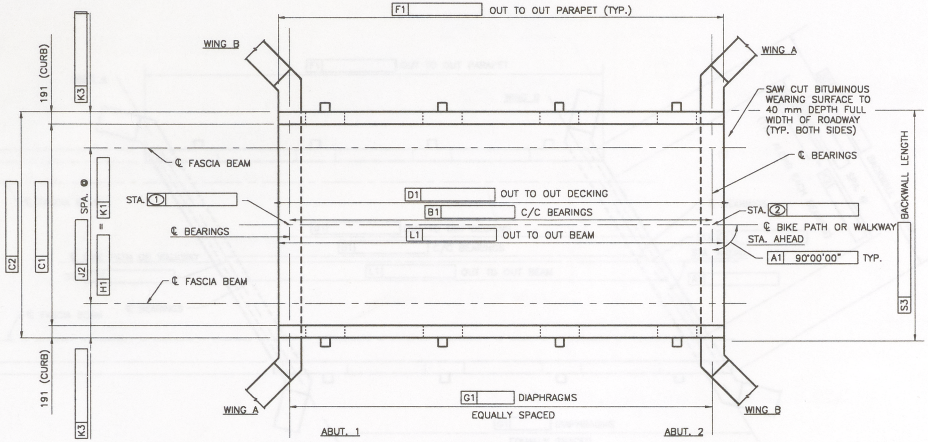
ENGINEER'S SEAL

SERIES NO: 102M
SHEET NO: 6
SERIES TITLE: GLULAM BEAM SUPERSTRUCTURE

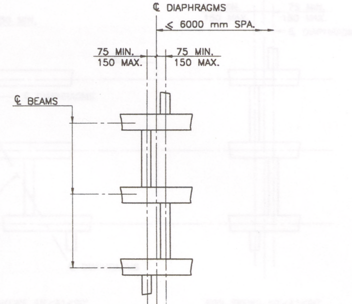
SHEET____of____




## FRAMING PLAN

NO SCALE

NOTE:
REFER TO 102M SHEET 9
FOR SUPERSTRUCTURE DETAILS




## DIAPHRAGM PLACEMENT DETAIL

NO SCALE

## NOTES:

1. PROVIDE MECHANICALLY GALVANIZED SWEDGE OF APPROVED TYPE OF ANCHOR BOLTS. SET IN THE MASONRY AS SHOWN ON THE DESIGN DRAWINGS.
2. PROVIDE MINIMUM SIZE WELD IN ACCORDANCE WITH AASHTO/AWS CODE UNLESS LARGER WELD IS REQUIRED BY DESIGN.
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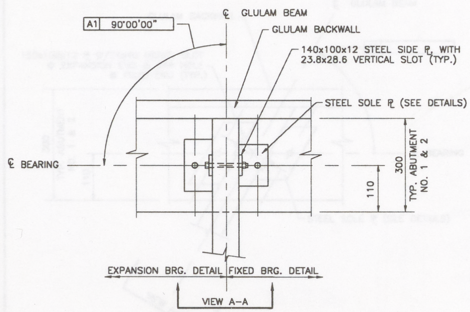
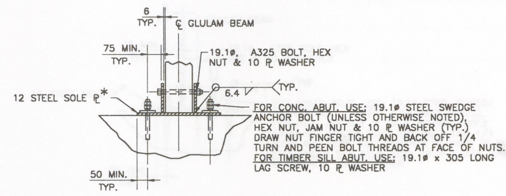



## BEARING PLAN DETAIL

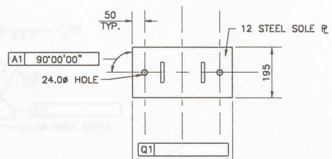
NO SCALE




## VIEW A–A

NO SCALE

* SLOPE BEAM SEAT PARALLEL TO BOTTOM OF BEAM




## BEARING ℗ DETAIL

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

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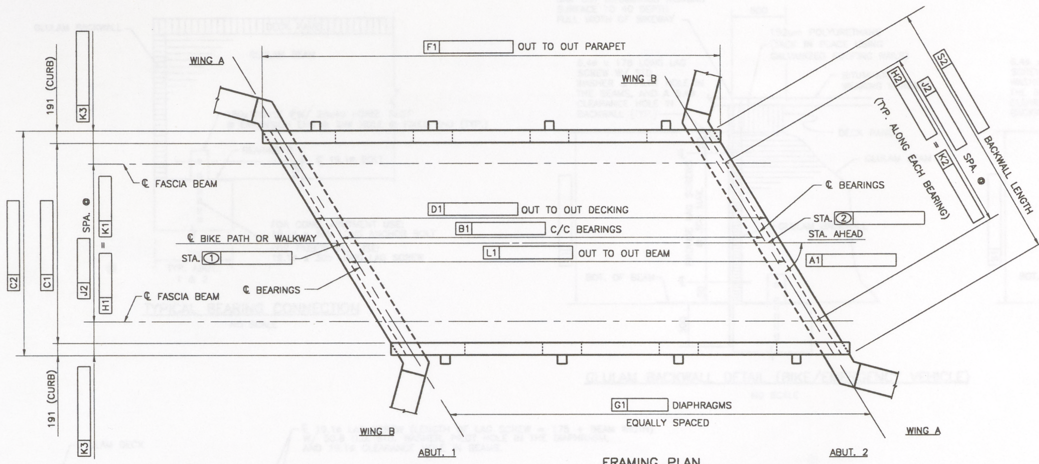
ENGINEER'S SEAL

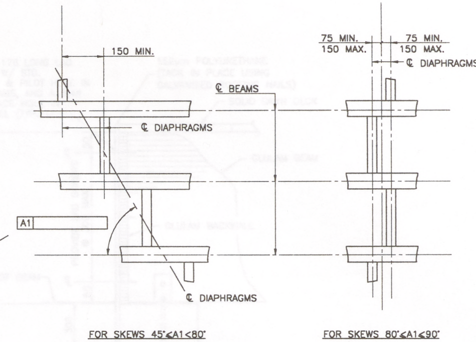
# FRAMING PLAN – 90° SKEW

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 7 | GLULAM BEAM SUPERSTRUCTURE |

SHEET___of___

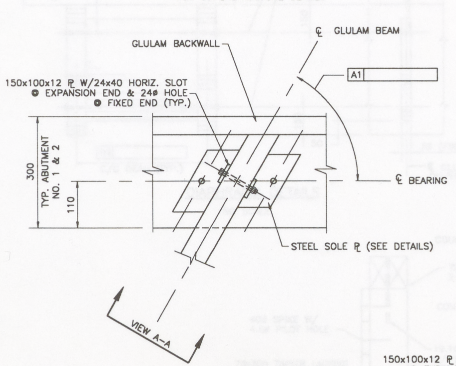



FRAMING PLAN
NO SCALE

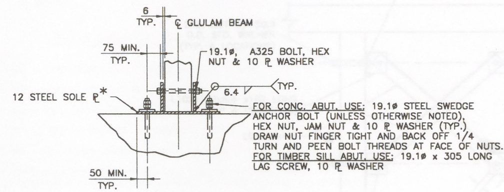



DIAPHRAGM PLACEMENT DETAIL
NO SCALE

NOTE:
REFER TO 102M SHEET 9
FOR SUPERSTRUCTURE DETAILS




BEARING PLATE DETAIL
NO SCALE




VIEW A–A
NO SCALE

* SLOPE BEAM SEAT PARALLEL TO BOTTOM OF BEAM

NOTES:

1. PROVIDE MECHANICALLY GALVANIZED SWEDGE OR APPROVED TYPE OF ANCHOR BOLTS. SET IN THE MASONRY AS SHOWN ON THE DESIGN DRAWINGS.
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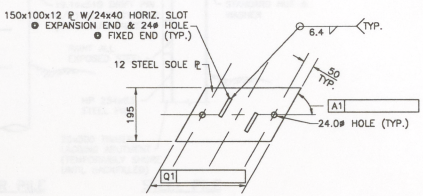
6. BLAST CLEAN CONCRETE BEARING SURFACES TO ACHIEVE ROUGH TEXTURE IF REQUIRED.




BEARING PLATE DETAIL
NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
| --- | --- | --- | --- | --- | --- |
| | REVISIONS | | | | |

FRAMING PLAN – RIGHT SKEW

ENGINEER'S SEAL

SERIES NO: 102M
SHEET NO: 8
SERIES TITLE: GLULAM BEAM SUPERSTRUCTURE

SHEET____of____

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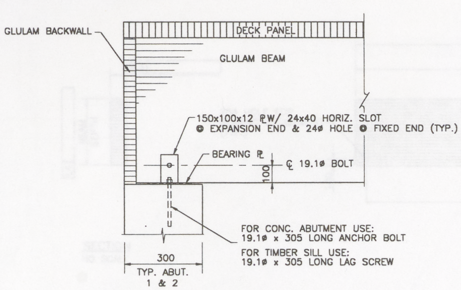
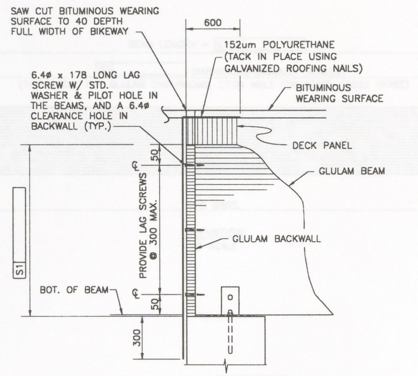
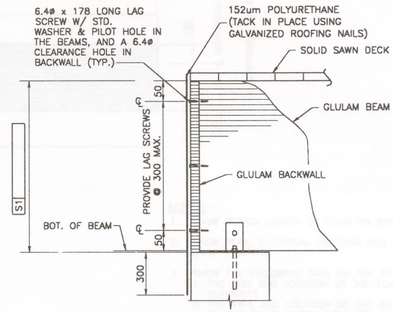


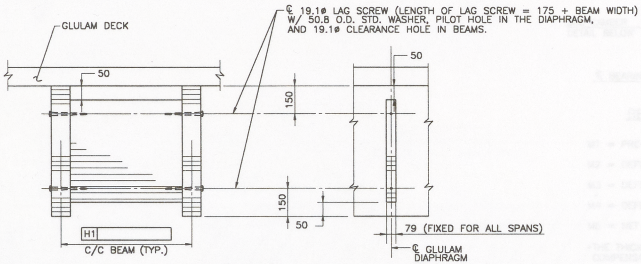

TYPICAL BEARING CONNECTION
NO SCALE



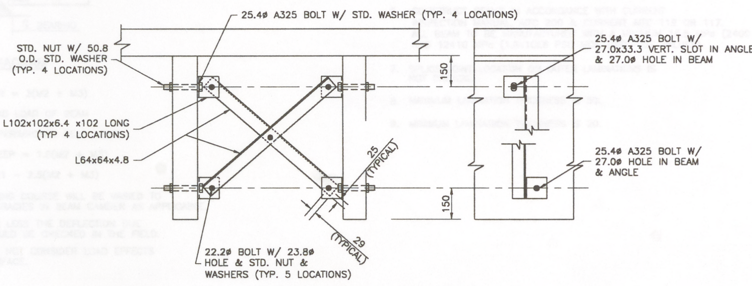

GLULAM BACKWALL DETAIL (BIKE/EMERGENCY VEHICLE)
NO SCALE



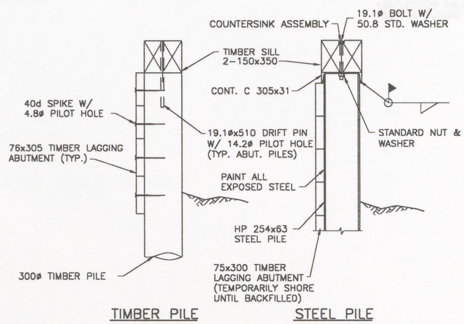

GLULAM BACKWALL DETAIL (PEDESTRIAN)
NO SCALE




DIAPHRAGM DETAILS
NO SCALE




ALTERNATE STEEL CROSS BRACE DETAILS
NO SCALE
(L4 < 1400)




TIMBER SILL DETAIL
NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| REVISIONS | | | | | |

## SUPERSTRUCTURE DETAILS

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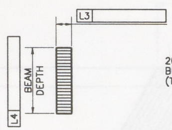
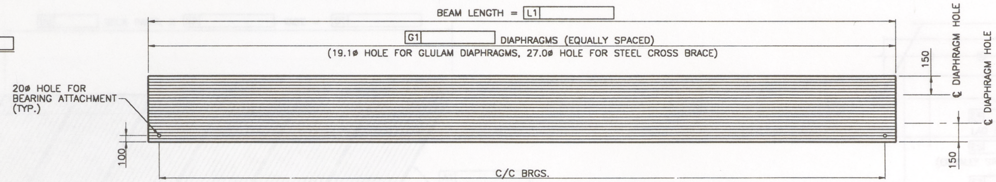
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 9 | GLULAM BEAM SUPERSTRUCTURE |

SHEET___of___




**SECTION**
NO SCALE

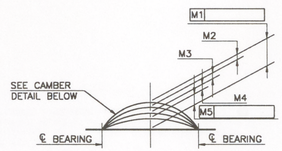



**ELEVATION**
NO SCALE

**NOTES:**

1. SHOW DESIGN LENGTH OF BEAM ON SHOP DRAWINGS.
2. SHOW PLAN, ELEVATION, SECTIONS AND ALL DETAILS ON SHOP DRAWINGS.
3. SHOW THE FOLLOWING DATA ON THE SHOP DRAWINGS:
   1. THE SIZE AND LOCATION OF THE TEMPORARY STORAGE SUPPORTS.
   2. THE TYPE AND LOCATION OF THE BRACING AND TEMPORARY SUPPORTS USED FOR THE TRANSPORTATION OF THE BEAMS.
4. FABRICATOR CHECKS STABILITY FOR HANDLING AND TRANSPORTING OF THE MEMBERS.
5. SEE 102M SHEET 9 OR 10 FOR DIAPHRAGM BOLT HOLE LOCATIONS.

   SEE 102M SHEET 8 OR 9 FOR BEARING ATTACHMENT HOLE LOCATIONS.
6. CONSTRUCT BEAMS IN ACCORDANCE WITH CURRENT INSPECTION MANUAL, AITC 200 & CURRENT AITC 119 OR 117. ALL BEAM TO BE MANUFACTURED WITH A MINIMUM 16.5 MPa (2400 PSI) $F_b$ AND 12410 MPa (1.8x10E6 PSI) MOE (DRY-USE VALUES).
7. SPLICE JOINT LOCATION ON OUTER LAMINATIONS IS NOT CRITICAL.
8. MAXIMUM LAMINATION THICKNESS IS 50.
9. MINIMUM LAMINATIION THICKNESS IS 20.




**BEAM CAMBER DIAGRAM**

M1 = PRE-FABRICATED CAMBER = 3(M2 + M3)

M2 = DEFLECTION DUE TO DEAD LOAD OF BEAM

M3 = DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD

M4 = DEFLECTION DUE TO CREEP = 1.5(M2 + M3)

M5 = NET FINAL CAMBER = M1 − 2.5(M2 + M3)

- THE THICKNESS OF THE WEARING COURSE WILL BE VARIED TO COMPENSATE FOR ANY INACCURACIES IN BEAM CAMBER AS APPLICABLE.
- THE PRE-FABRICATED CAMBER LESS THE DEFLECTION DUE TO DEAD LOAD OF BEAM SHOULD BE CHECKED IN THE FIELD.
- DEFLECTION CALCULATIONS DO NOT CONSIDER LOAD EFFECTS DUE TO FUTURE WEARING SURFACE.

| Mark | Description | By | Chk'd | App'd | Date |
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REVISIONS

**BEAM DETAILS**

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 10 | GLULAM BEAM SUPERSTRUCTURE |

ENGINEER'S SEAL

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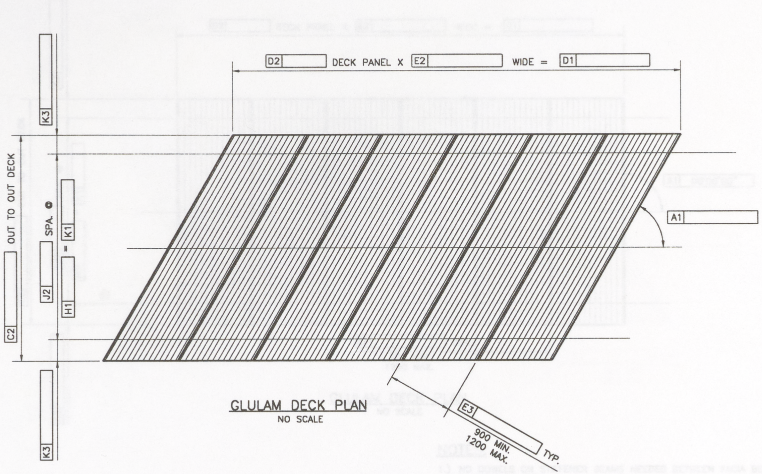
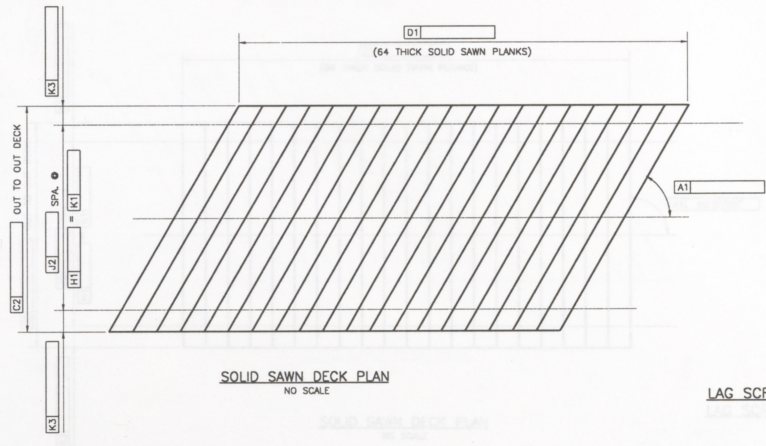
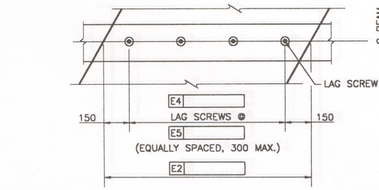
SHEET____of____



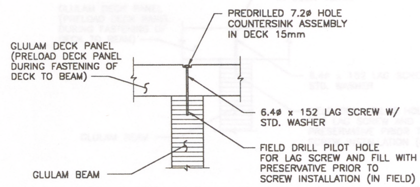

GLULAM DECK PLAN
NO SCALE



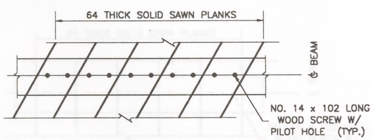

SOLID SAWN DECK PLAN
NO SCALE




LAG SCREW DECK ANCHORAGE PLAN (GLULAM DECK)
NO SCALE




LAG SCREW DECK ANCHORAGE DETAIL (GLULAM DECK)
NO SCALE




LAG SCREW DECK ANCHORAGE PLAN (SOLID SAWN DECK)
NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

DECK PLAN – LEFT SKEW

PREPARED BY:
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STATE COLLEGE, PA

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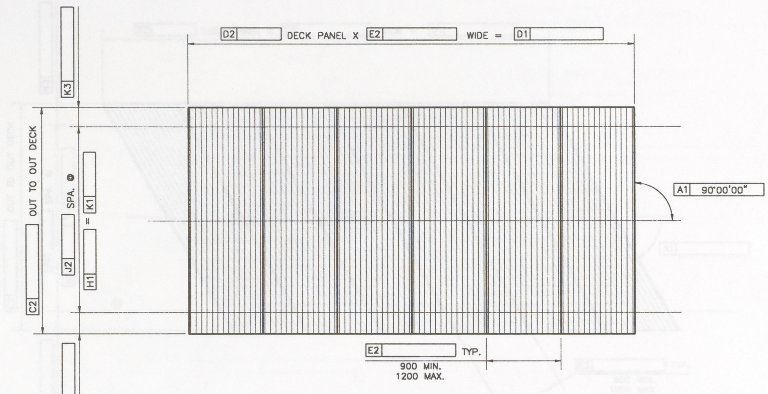
ENGINEER'S SEAL

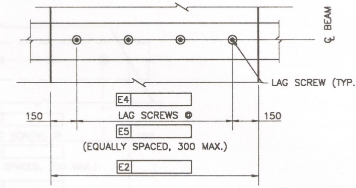
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 11 | GLULAM BEAM SUPERSTRUCTURE |

SHEET____of____



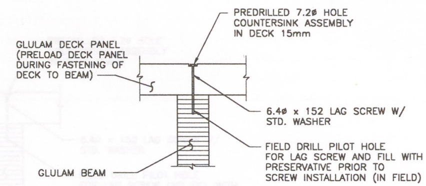

GLULAM DECK PLAN

NO SCALE




LAG SCREW DECK ANCHORAGE PLAN (GLULAM DECK)

NO SCALE

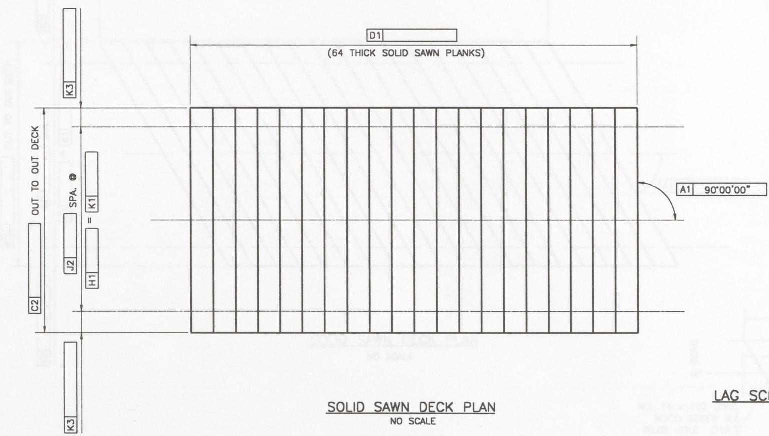



LAG SCREW DECK ANCHORAGE DETAIL (GLULAM DECK)

NO SCALE

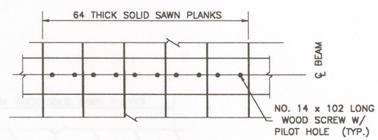
NOTES:

1.) NO DOWELS OR STIFFENER BEAMS NEEDED BETWEEN FACIA BEAM AND OUTSIDE OF DECK.
2.) PRELOAD DECK PANEL WHILE FASTENING PANEL TO BEAM.
3.) PROVIDE ADEQUATE SPACING BETWEEN THE DECK ANCHORAGE AND THE DOWEL SYSTEM. ADJUSTMENTS TO THE DOWEL SYSTEM AND/OR DECK ANCHORAGE'S SPACING MAY BE NECESSARY.




SOLID SAWN DECK PLAN

NO SCALE




LAG SCREW DECK ANCHORAGE PLAN (SOLID SAWN DECK)

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

DECK PLAN – 90° SKEW

PREPARED BY:

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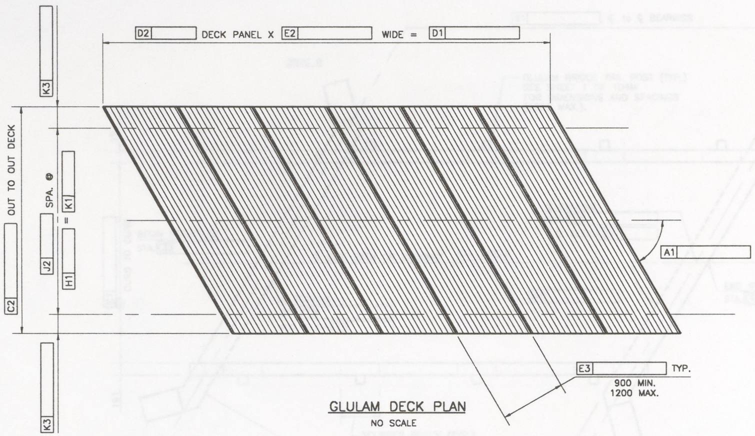
ENGINEER'S SEAL

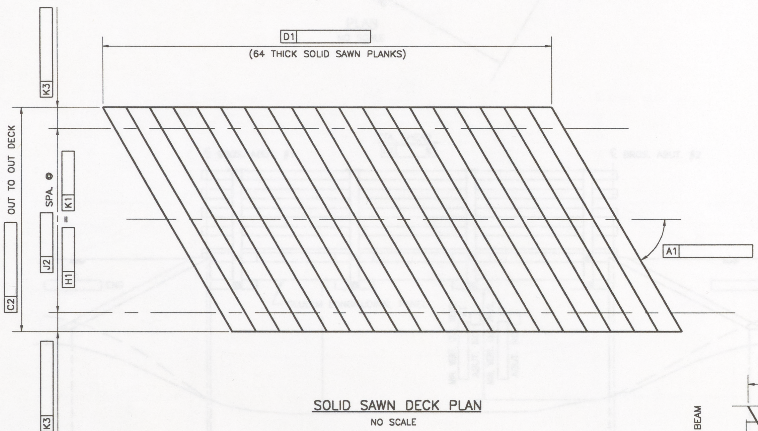
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 12 | GLULAM BEAM SUPERSTRUCTURE |

SHEET____of____



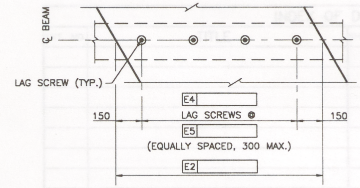

GLULAM DECK PLAN

NO SCALE



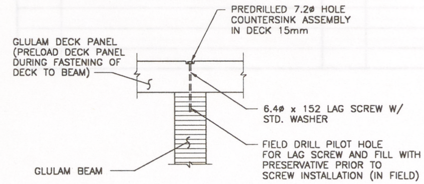

SOLID SAWN DECK PLAN

NO SCALE



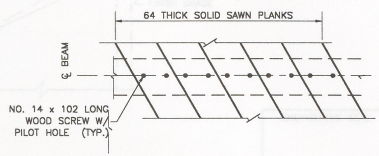

LAG SCREW DECK ANCHORAGE PLAN (GLULAM DECK)

NO SCALE




LAG SCREW DECK ANCHORAGE DETAIL (GLULAM DECK)

NO SCALE




LAG SCREW DECK ANCHORAGE PLAN (SOLID SAWN DECK)

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

DECK PLAN – RIGHT SKEW

PREPARED BY:

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CONSULTING ENGINEERS
STATE COLLEGE, PA

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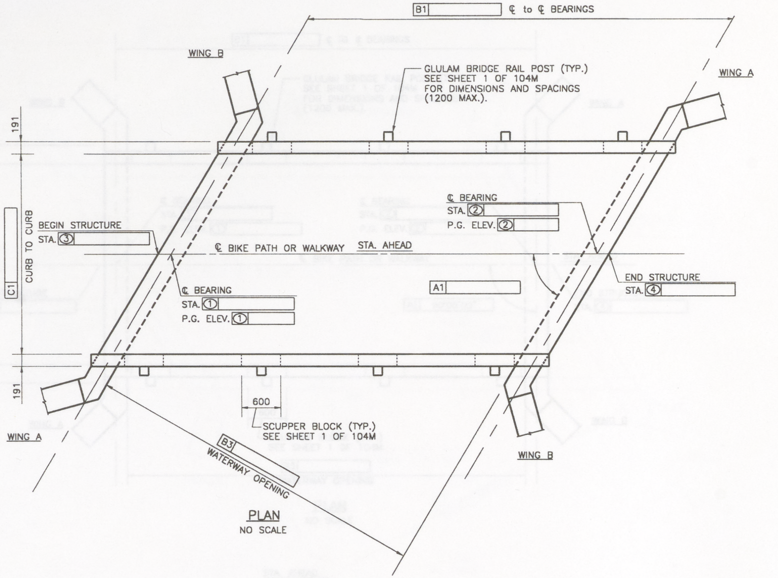
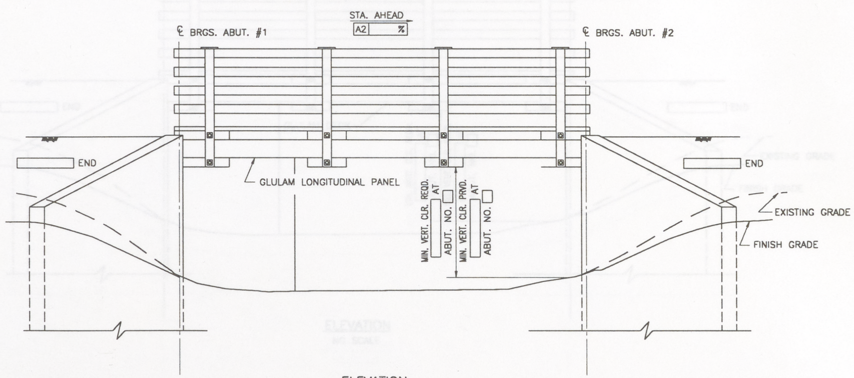
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 102M | 13 | GLULAM BEAM SUPERSTRUCTURE |

SHEET____of____




PLAN
NO SCALE




ELEVATION
NO SCALE

INDEX OF DRAWINGS

| SHT. NO. | TITLE | SHT. NO. | TITLE |
|---|---|---|---|
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HYDRAULIC DATA
(DESIGNER)

DRAINAGE AREA –
DESIGN FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –
100 YEAR FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| REVISIONS | | | | | |

GENERAL PLAN & ELEVATION – LEFT SKEW

ENGINEERING SEAL

SIGNATURE & DATE

PREPARED BY:

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 103M | 1 | GLULAM PANEL SUPERSTRUCTURE |

SHEET____of____

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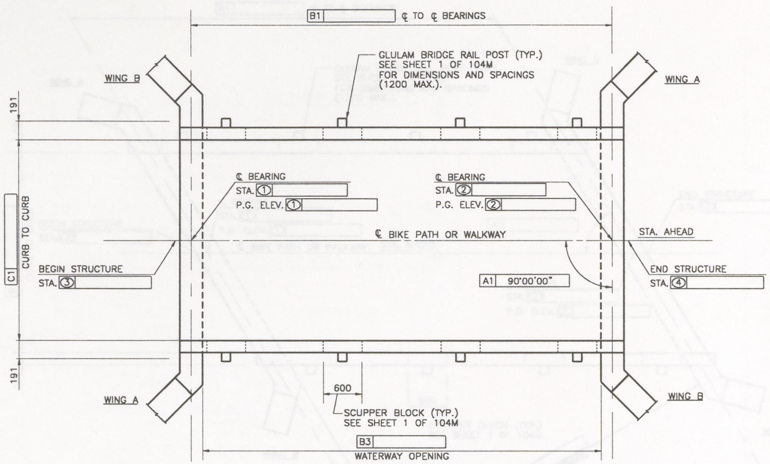
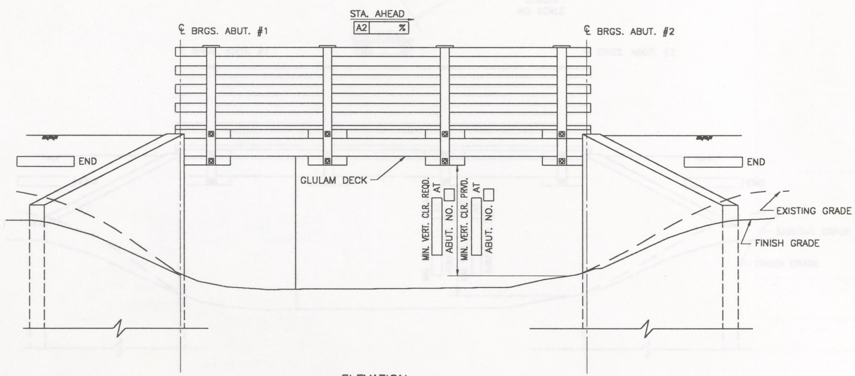
CONSULTING ENGINEERS
STATE COLLEGE, PA




PLAN
NO SCALE




ELEVATION
NO SCALE

| INDEX OF DRAWINGS | | | |
|---|---|---|---|
| SHT. NO. | TITLE | SHT. NO. | TITLE |

HYDRAULIC DATA
(DESIGNER)
DRAINAGE AREA –
DESIGN FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –
100 YEAR FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

GENERAL PLAN & ELEVATION – 90° SKEW

ENGINEERING SEAL

SIGNATURE & DATE

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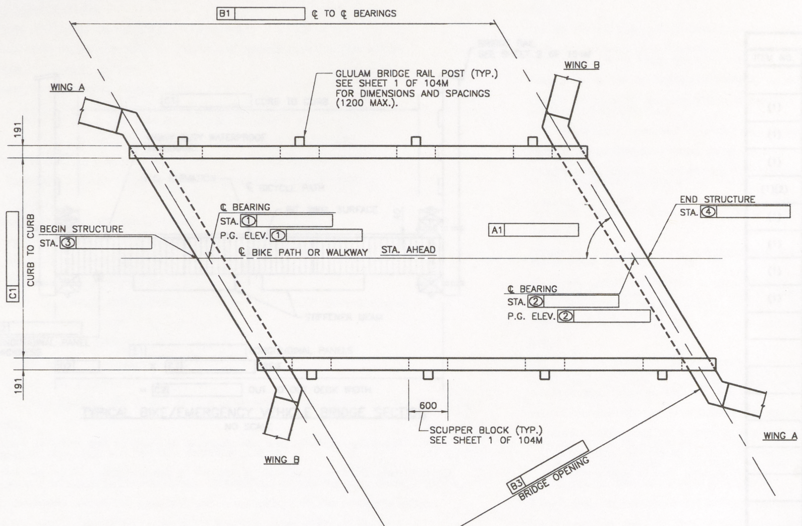
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 103M | 2 | GLULAM PANEL SUPERSTRUCTURE |

SHEET____of____

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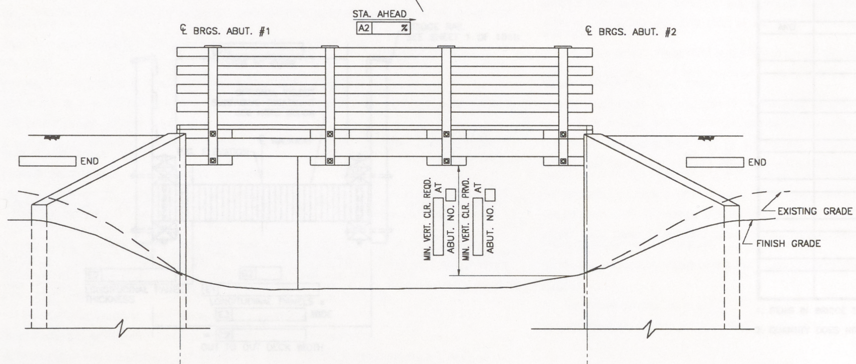
NO SCALE




## ELEVATION
NO SCALE

## INDEX OF DRAWINGS

| SHT. NO. | TITLE | SHT. NO. | TITLE |
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## HYDRAULIC DATA
(DESIGNER)

DRAINAGE AREA –
DESIGN FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –
100 YEAR FLOOD
DISCHARGE –
FREQUENCY –
ELEVATION –

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

## GENERAL PLAN & ELEVATION – RIGHT SKEW

| ENGINEERING SEAL | PREPARED BY: |
|---|---|
| SIGNATURE & DATE | |

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 103M | 3 | GLULAM PANEL SUPERSTRUCTURE |

SHEET____of____

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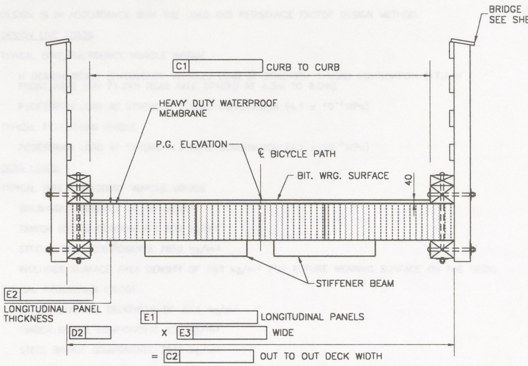
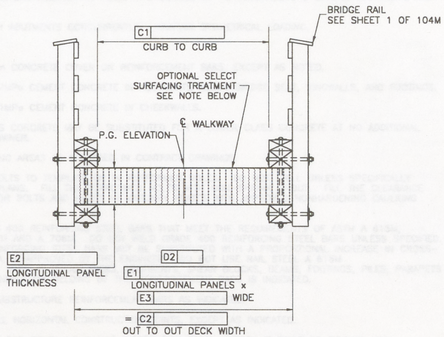



## TYPICAL BIKE/EMERGENCY VEHICLE BRIDGE SECTION

NO SCALE




## TYPICAL PEDESTRIAN BRIDGE SECTION

NO SCALE

NOTE: SELECT SURFACE TREATMENT IS PERCOL ELASTIC CEMENT (MICROSURFACING) BY E.J. BRENEMAN, INC. (610-678-9691) OR AN APPROVED EQUAL. (10 mm THICK MAX.)

| APPROXIMATE QUANTITIES – BRIDGE STRUCTURE, AS DESIGNED | | | | | | |
|---|---|---|---|---|---|---|
| ITEM NO. | ITEM | UNIT | ABUT. 1 | ABUT. 2 | SUPERSTRUCTURE | TOTAL |
| | BRIDGE STRUCTURE AS DESIGNED | LS | | | | LS |
| (1) | GLUE LAMINATED LONGITUDINAL PANELS | $m^3$ | ----- | ----- | | |
| (1) | GLUE LAMINATED STIFFENER BEAMS | $m^3$ | ----- | ----- | | |
| (1) | SOLID SAWN TIMBER | $m^3$ | ----- | ----- | | |
| (1)(2) | BEARING PLATE ASSEMBLIES | kg | ----- | ----- | | |
| (1) | SELECT SURFACE TREATMENT | kg | ----- | ----- | | |
| (1) | 152 um POLYURETHANE | $m^2$ | ----- | ----- | | |
| (1) | HEAVY DUTY WATERPROOF MEMBRANE | $m^2$ | ----- | ----- | | |
| (1) | BITUMINOUS WEARING COURSE | kg | ----- | ----- | | |
| AND | | | | | | |

1. ITEMS IN BRIDGE STRUCTURE LUMP SUM ITEM GIVEN FOR INFORMATION ONLY.
2. QUANTITY DOES NOT INCLUDE ANY CONNECTION HARDWARE

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ENGINEER'S SEAL

TYPICAL SECTION & QUANTITIES

SERIES NO: 103M
SHEET NO: 4
SERIES TITLE: GLULAM PANEL SUPERSTRUCTURE

SHEET____of____

## GENERAL NOTES:

DESIGN SPECIFICATIONS

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (1994)

DESIGN IS IN ACCORDANCE WITH THE LOAD AND RESISTANCE FACTOR DESIGN METHOD.

DESIGN LIVE LOADS

TYPICAL BIKE/EMERGENCY VEHICLE BRIDGE

H DESIGN TRUCK (EMERGENCY VEHICLE) LOAD AT STRENGTH 1 LOAD COMBINATION (17.2KN FRONT AXLE AND 71.2KN REAR AXLE SPACED AT 4.3m TO 9.0m)

PEDESTRIAN LOAD AT STRENGTH 1 LOAD COMBINATION ($4.1 \times 10^{-3}$ MPa)

TYPICAL PEDESTRIAN BRIDGE

PEDESTRIAN LOAD AT STRENGTH 1 LOAD COMBINATION ($4.1 \times 10^{-3}$ MPa)

DEAD LOADS

TYPICAL BIKE/EMERGENCY VEHICLE BRIDGE

BITUMINOUS SURFACE OF 90 $kg/m^2$

TIMBER BRIDGE COMPONENTS 800 $kg/m^3$

STEEL BRIDGE COMPONENTS 7850 $kg/m^3$

INCLUDES SURFACE AREA DENSITY OF 150 $kg/m^2$ FOR FUTURE WEARING SURFACE ON THE DECK.

TYPICAL PEDESTRIAN BRIDGE

SELECT SURFACE TREATMENT OF 22.5 $kg/m^2$

TIMBER BRIDGE COMPONENTS 800 $kg/m^3$

STEEL BRIDGE COMPONENTS 7850 $kg/m^3$

INCLUDES SURFACE AREA DENSITY OF 150 $kg/m^2$ FOR FUTURE WEARING SURFACE ON THE DECK.

GENERAL

PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH AASHTO/AWS/D1.5-88 BRIDGE WELDING CODE, AND CONTRACT SPECIAL PROVISIONS.

NOTIFY THE REGIONAL HEADQUARTERS OF THE FISH COMMISSION PRIOR TO CONSTRUCTION AND COOPERATE WITH FISH COMMISSION DURING CONSTRUCTION OF BRIDGES OVER FISHABLE STREAMS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL AND IN MILLIMETERS UNLESS OTHERWISE NOTED.

SUPERSTRUCTURE DIMENSIONS SHOWN ARE FOR NORMAL TEMPERATURE OF 20° C.

SPREAD FOOTINGS MAY BE ORDERED BY THE ENGINEER TO BE AT ANY ELEVATION OR OF ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION.

THE SUPERSTRUCTURE MUST BE IN PLACE AND CONNECTED TO SUBSTRUCTURE BEFORE ABUTMENTS ARE BACKFILLED.

BACK FILL BOTH ABUTMENTS CONCURRENTLY. MAINTAIN SYMMETRICAL LOADING.

CONCRETE

PROVIDE 50 mm CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.

USE CLASS 20.7MPa CEMENT CONCRETE IN ABUTMENTS BELOW BRIDGE SEAT, WINGWALLS, AND FOOTINGS.

USE CLASS 24.1MPa CEMENT CONCRETE IN CHEEKWALLS.

A HIGHER CLASS CONCRETE MAY BE SUBSTITUTED FOR A LOWER CLASS CONCRETE AT NO ADDITIONAL COST TO THE OWNER.

PREPARE BEARING AREAS AS SPECIFIED IN CONTRACT DRAWINGS.

SET ANCHOR BOLTS TO TEMPLATE OR IN PERFORMED HOLES. DO NOT DRILL UNLESS SPECIFICALLY INDICATED ON PLANS. FILL THE PERFORMED HOLES WITH NON-SHRINK GROUT. FILL THE CLEARANCE BETWEEN ANCHOR BOLTS AND HOLES IN MASONRY PLATES WITH APPROVED NONHARDENING CAULKING COMPOUND.

PROVIDE GRADE 400 REINFORCING STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A 615M, A 616M, A 617M AND A 706M. DO NOT WELD GRADE 400 REINFORCING STEEL BARS UNLESS SPECIFIED. GRADE 300 REINFORCING STEEL BARS MAY BE SUBSTITUTED WITH A PROPORTIONAL INCREASE IN CROSS-SECTIONAL AREA, IF APPROVED BY THE ENGINEER. DO NOT USE RAIL STEEL A 616M REINFORCEMENT BARS IN BRIDGE PIERS, ABUTMENTS, SHEAR BLOCKS, BEAMS, FOOTINGS, PILES, PARAPETS AND WHERE BENDING OR WELDING OF THE REINFORCEMENT BARS IS INDICATED.

EPOXY-COAT SUBSTRUCTURE REINFORCEMENT BARS AS INDICATED.

RAKE-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS INDICATED.

REINFORCEMENT BAR SCHEDULE IS FOR INFORMATION ONLY. VERIFY IT PRIOR TO BIDDING AND FABRICATION.

PLACE CHEEKWALL CONCRETE AFTER BEAMS ARE SET IN POSITION.

CHAMFER EXPOSED CONCRETE EDGES 25 mm BY 25 mm, EXCEPT AS NOTED.

PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH OF 30 DIAMETERS OR IN ACCORDANCE WITH ASSHTO SECTION A5.11 AND 05.11, WHICHEVER IS GREATER.

## GENERAL NOTES CONTINUED:

STEEL

HOT DIP GALVANIZE ALL TIMBER CONNECTION HARDWARE.

PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270, GRADE 250 (ASTM A709M, GRADE 250) DESIGNATION, EXCEPT WHEN NOTED OTHERWISE.

PROVIDE BOLTS AND LAG SCREWS CONFORMING TO ASTM A307 DESIGNATION, EXCEPT WHEN NOTED OTHERWISE.

PROVIDE BOLTS, NUTS, AND WASHERS IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATION SECTION 6.4.3.

PROVIDE MALLEABLE IRON WASHER CONFORMING TO ASTM A47M, GRADE 24118.

PROVIDE LAG SCREWS CONFORMING TO ANSI B18.2.1 – 1981.

PROVIDE WOOD SCREWS IN ACCORDANCE WITH ANSI/ASME B18.6.1. WITH A MINIMUM THREADED PORTION OF TWO-THIRDS THE LENGTH OF THE SHAFT.

MANUFACTURE SHEAR PLATE CONNECTORS FROM PRESSED STEEL MEETING SOCIETY OF AUTOMOTIVE ENGINEERS SPECIFICATION SAE-1010 OR AN APPROVED EGUAL.

UTILITIES

COORDINATE THE REQUIREMENTS FOR PROTECTION AND/OR RELOCATION OF UTILITIES WITH THE UTILITY OWNER PRIOR TO STARTING WORK.

VERIFY AND LOCATE ALL EXISTING UTILITIES PRIOR TO STARTING WORK; CONDUCT OPERATIONS IN A MANNER WHICH ENSURES THAT THE UTILITIES WILL NOT BE DISTURBED OR ENDANGERED, AND ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE TO UTILITIES DURING CONSTRUCTION. THE DEPARTMENT DOES NOT ASSUME RESPONSIBILITY FOR REIMBURSEMENT, PARTICIPATION IN DESIGN AND/OR REVISIONS, OR LIABILITY FOR ACCURACY OF TYPE, SIZE, AND LOCATION OF ANY UTILITY.

TIMBER

USE ONLY GLUE LAMINATED TIMBER FABRICATED WITH EITHER SOUTHERN PINE, RED MAPLE OR DOUGLAS FIR LUMBER GRADED PER NORTHEASTERN LUMBER MANUFACTURER'S ASSOCIATION (RED MAPLE) OR NORTHERN SOFTWOOD LUMBER BUREAU (DOUGLAS FIR AND SOUTHERN PINE) STANDARDS AND MANUFACTURED FOLLOWING AITC 119, AITC 117 OR CURRENT SPECIFICATIONS.

PROVIDE MINIMUM WET-USE BASE RESISTANCES AND MOE VALUES IN ACCORDANCE WITH SHEET 2 OF 100M.

ALL SAWN LUMBER SHALL BE TREATED IN ACCORDANCE WITH THE REQUIREMENTS OF AWPA STANDARD C14 WITH ONE OF THE FOLLOWING PRESERVATIVES:

A. CREOSOTE CONFORMING TO AWPA STANDARD P1
B. PENTACHLOROPHENOL CONFORMING TO AWPA STANDARD P8 IN HYDROCARBON SOLVENT, TYPE A, CONFORMING TO AWPA STANDARD P9
C. CCA CONFORMING TO AWPA STANDARD P5

GLULAM SHALL BE TREATED TO THE ABOVE REQUIREMENTS WITH CREOSOTE OR PENTACHLOROPHENOL.

TREATED MATERIAL SHALL BE FREE OF EXCESS PRESERVATIVES ON THE WOODS SURFACE. THE TREATING PROCESS FOR THESE PRESERVATIVES SHALL INCLUDE AN EXPANSION BATH, STEAMING AND/OR DRIPPING TO ENSURE THAT THE PRESERVATIVE WILL NOT BLEED.

TREATED WOOD SHALL BE INSPECTED AND CERTIFIED IN ACCORDANCE WITH AWPA STANDARD M2.

TREAT ALL ABRASIONS AND CUTS MADE IN THE FIELD WITH THREE BRUSH COATS OF THE FIELD TREATMENT SOLUTION.

FIELD CUTTING IS NOT PERMITTED UNLESS APPROVED BY THE ENGINEER.

WHEN FIELD CUTTING, TREAT WITH BITUMINOUS ASPHALT BASED ROOF CEMENT, COPPER NAPHTHENATE PASTE, OR APPROVED PRESERVATIVE SYSTEM.

PROVIDE PILOT HOLES FOR LAG SCREWS IN RANGE OF (0.06)D TO (0.85)D

LEAD HOLES FOR LAG SCREWS WITH D< 12.7mm ARE D+ 0.8mm

LEAD HOLES FOR LAG SCREWS WITH D> 12.7mm ARE D+ 1.6mm

ALWAYS COAT LAG SCREW THREADS WITH BITUMINOUS ASPHALT BASED ROOF CEMENT, COPPER NAPHTHENATE PASTE, OR APPROVED PRESERVATIVE SYSTEM BEFORE INSTALLING LAG SCREW.

DO NOT DRIVE LAG SCREW WITH HAMMER. SCREW OR TORQUE LAG SCREWS.

PROVIDE SUFFICIENT LAG SCREW LENGTH SO LAG SCREW SHANK WILL PENETRATE RECEIVING MEMBER.

SUBMIT SHOP DRAWINGS SHOWING DETAILS OF ALL GLULAM CONSTRUCTION FOR APPROVAL TO THE ENGINEER PRIOR TO FABRICATION OPERATIONS.

ALL TIMBER DIMENSIONS SHOWN ARE ACTUAL UNLESS OTHERWISE NOTED.

PILES

DO NOT PERMIT SPLICES IN PILES.

PROVIDE PILES IN ACCORDANCE WITH SHEET 2 OF 100M.

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| REVISIONS | | | | | |

GENERAL NOTES

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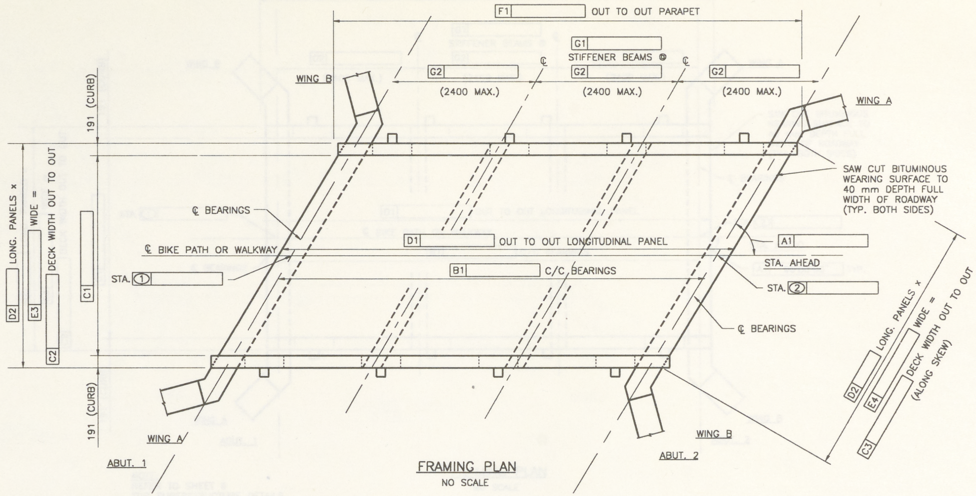
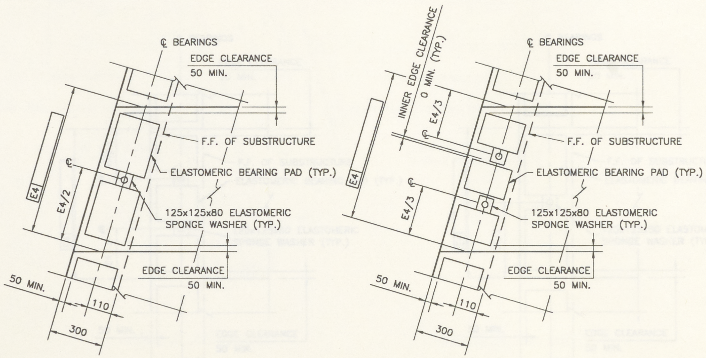
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 103M | 5 | GLULAM PANEL SUPERSTRUCTURE |

SHEET____of____




FRAMING PLAN
NO SCALE




CONCRETE ABUTMENT

TIMBER & STEEL PILE

ELASTOMERIC BEARING PAD ARRANGEMENTS
NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
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| | | | | | |

REVISIONS

FRAMING PLAN – LEFT SKEW

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ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
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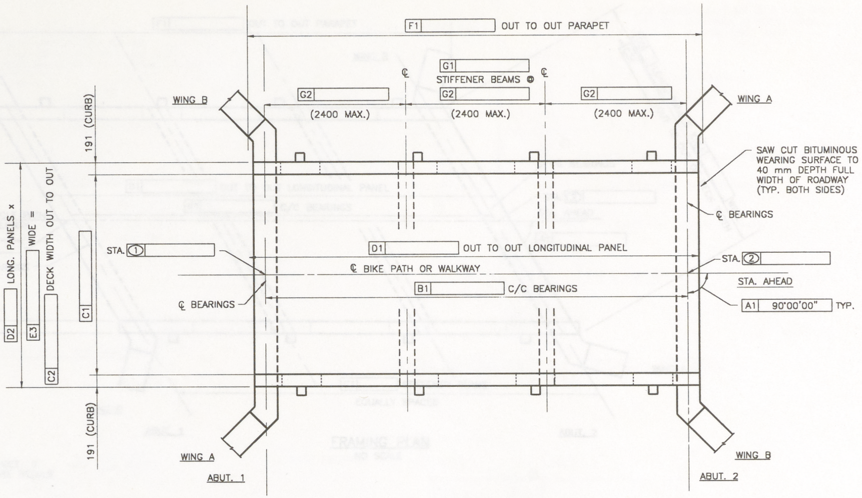
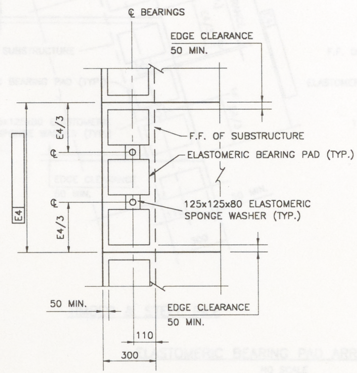
| 103M | 6 | GLULAM PANEL SUPERSTRUCTURE |

SHEET____of____

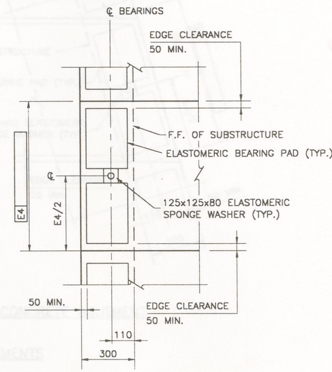



NOTE:
REFER TO SHEET 9
FOR SUPERSTRUCTURE DETAILS

FRAMING PLAN
NO SCALE




TIMBER & STEEL PILE




CONCRETE ABUTMENT

ELASTOMERIC BEARING PAD ARRANGEMENTS
NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | REVISIONS | | | | |

FRAMING PLAN – 90° SKEW

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ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
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| 103M | 7 | GLULAM PANEL SUPERSTRUCTURE |

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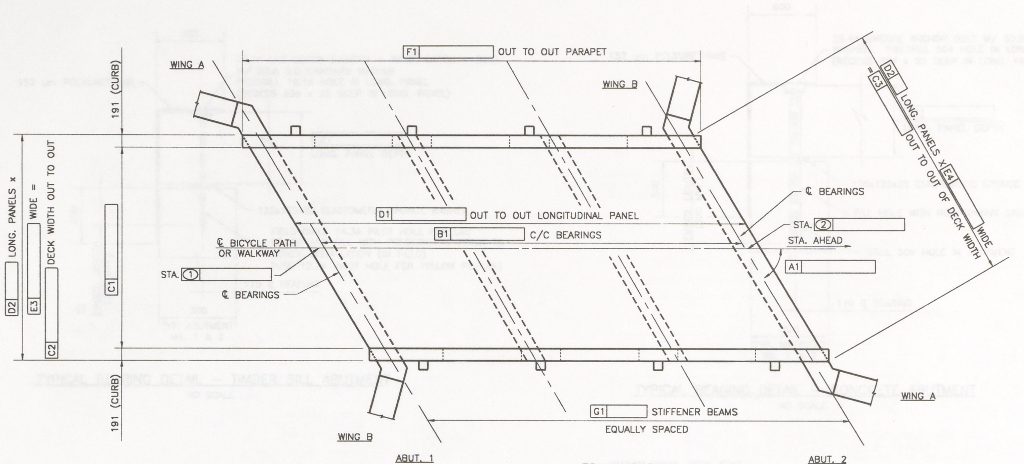
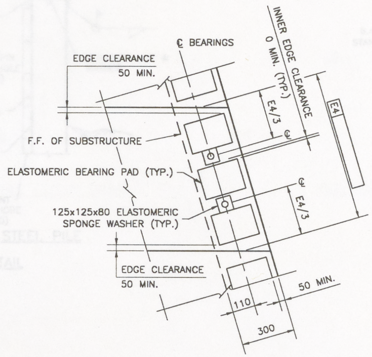



FRAMING PLAN

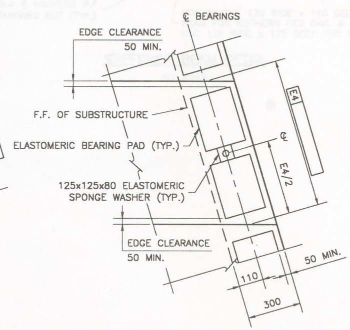
NO SCALE

NOTE:

REFER TO 103M SHEET 9 FOR SUPERSTRUCTURE DETAILS




TIMBER & STEEL PILE




CONCRETE ABUTMENT

ELASTOMERIC BEARING PAD ARRANGEMENTS

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
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| | | | | | |

REVISIONS

FRAMING PLAN – RIGHT SKEW

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ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
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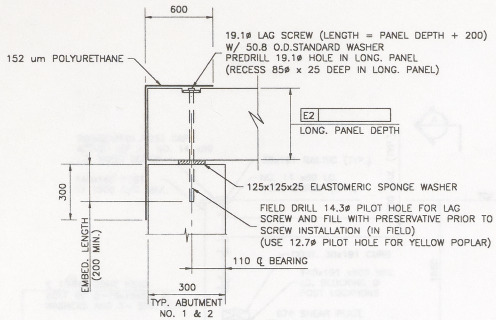
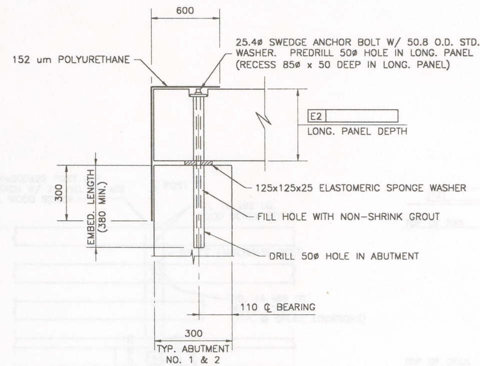
| 103M | 8 | GLULAM PANEL SUPERSTRUCTURE |

SHEET____of____



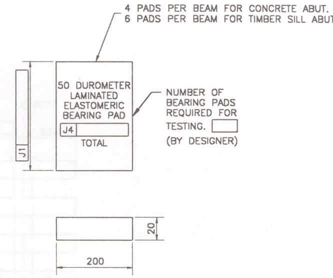

TYPICAL BEARING DETAIL – TIMBER SILL ABUTMENT

NO SCALE




TYPICAL BEARING DETAIL – CONCRETE ABUTMENT

NO SCALE

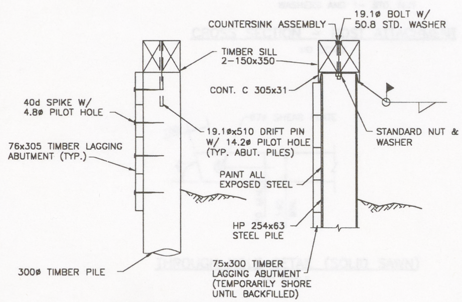



TYPICAL ELASTOMERIC BEARING PAD DETAIL

NO SCALE

ELASTOMERIC BEARING PAD NOTES:

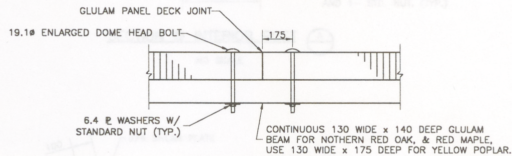
1. SMOOTH CUT AND DEBURR METAL SHIMS
2. GRIT BLAST AND DEGREASE METAL SHIMS.
3. ALL BEARING PADS ARE TO BE MOLDED TO DESIGN DIMENSIONS. CUTTING TO SIZE AFTER FABRICATION IS PROHIBITED.
4. MEET THE MATERIAL SPECIFICATION FOR ELASTOMERIC BEARING REQUIREMENTS OF CURRENT AASHTO (M-251-92 STANDARD SPECIFICATIONS BEARINGS) AS LISTED UNDER SUBSECTION "MATERIALS AND TESTING."
5. PROVIDE NEOPRENE 50 ± 5 DUROMETER.
6. PROVIDE INTERNAL SHIMS AS PER ASTM A570 GRADE 248 (36 KSI)
7. VULCANIZE PATCH PIN GROOVES.




TIMBER PILE STEEL PILE

TIMBER SILL DETAIL

NO SCALE




STIFFENER BEAM DETAIL

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

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ENGINEER'S SEAL

SUPERSTRUCTURE DETAILS

| SERIES NO: | SHEET NO: | SERIES TITLE: |
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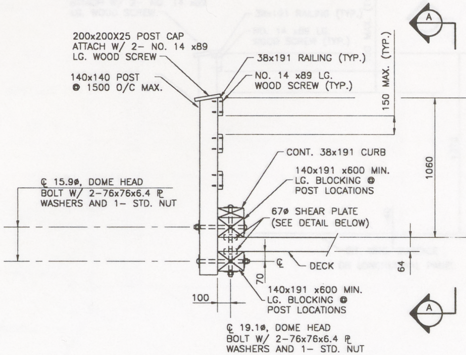
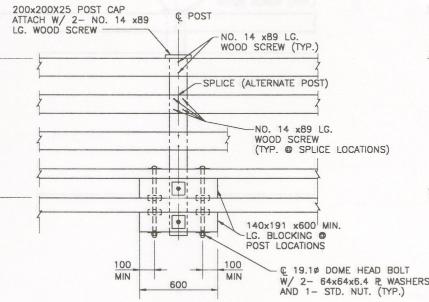
| 103M | 9 | GLULAM PANEL SUPERSTRUCTURE |

SHEET____of____



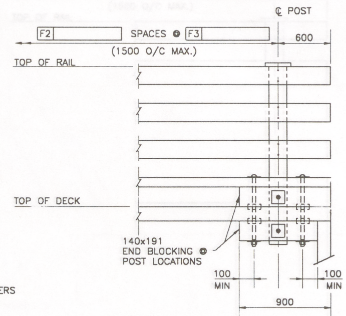

CROSS SECTION – POST ATTACHMENT

NO SCALE



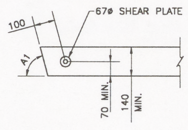

SECTION @ INTERIOR POST (A)

NO SCALE



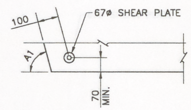

SECTION @ END OF BRIDGE (A)

NO SCALE




THROUGH HOLE DETAIL (SOLID SAWN)

NO SCALE




THROUGH HOLE DETAIL (GLULAM)

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

REVISIONS

PEDESTRIAN BRIDGE RAIL DETAILS

PREPARED BY:

P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

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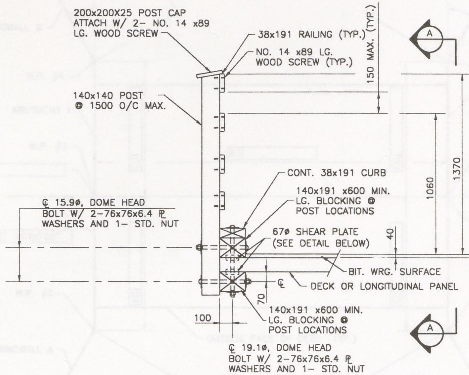
ENGINEER'S SEAL

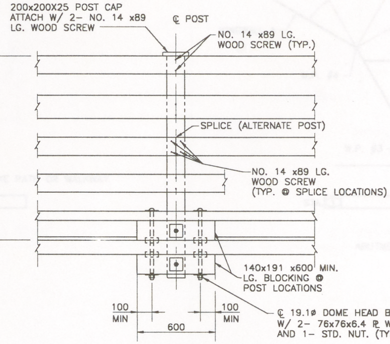
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 104M | 1 | SHT.'S COMMON TO 102M & 103M |

SHEET____of____



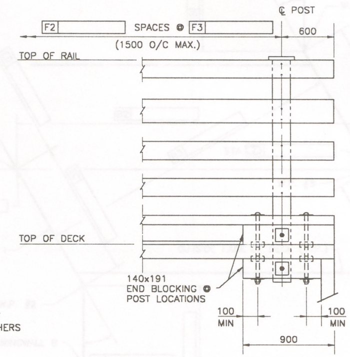

CROSS SECTION – POST ATTACHMENT

NO SCALE



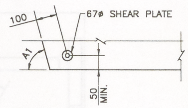

SECTION @ INTERIOR POST (A)

NO SCALE




SECTION @ END OF BRIDGE (A)

NO SCALE




THROUGH HOLE DETAIL (GLULAM)

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| REVISIONS | | | | | |

BIKE/EMERGENCY VEHICLE BRIDGE RAIL DETAILS

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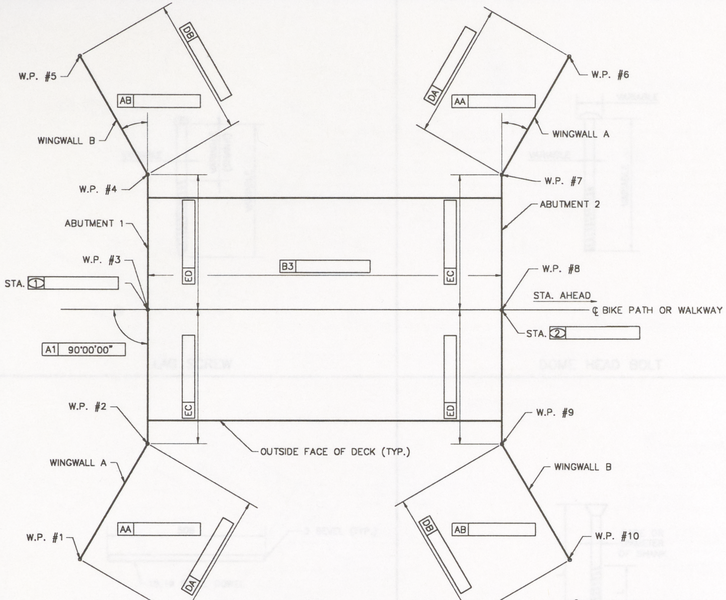
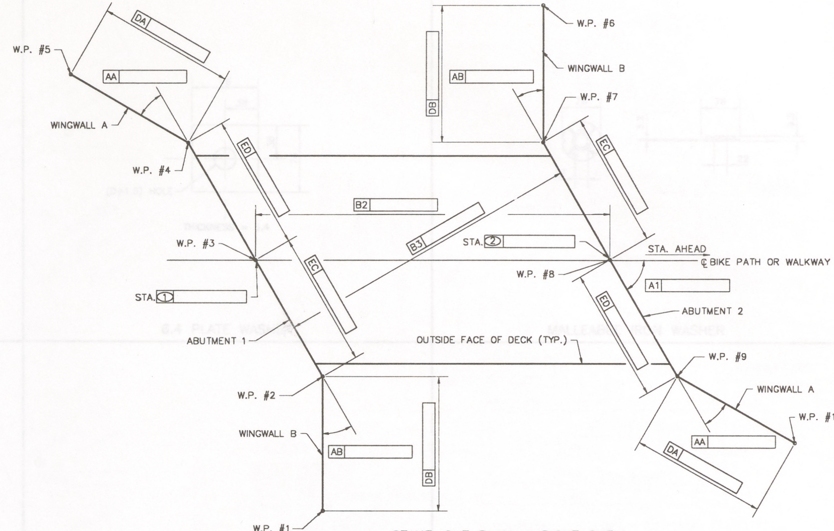
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 104M | 2 | SHT'S COMMON TO 102M & 103M |

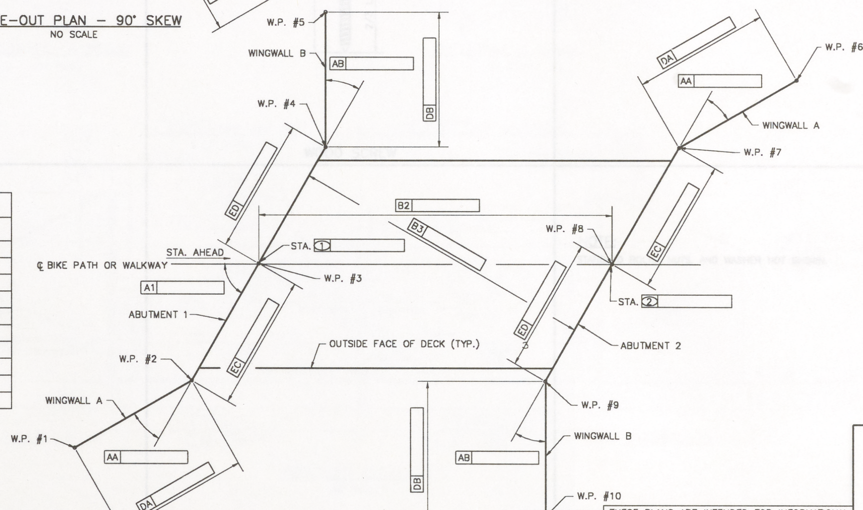
SHEET___of___




STAKE-OUT PLAN – 90° SKEW
NO SCALE




STAKE-OUT PLAN – RIGHT SKEW
NO SCALE




STAKE-OUT PLAN – LEFT SKEW
NO SCALE

TABLE OF COORDINATES

| W.P.# | NORTHING (m) | EASTING (m) |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

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ENGINEER'S SEAL

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

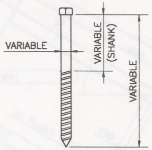
REVISIONS

GLULAM BEAMS

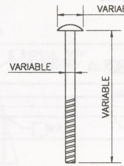
STAKE OUT PLAN

SERIES NO: 104M | SHEET NO: 3 | SERIES TITLE: SHT.'S COMMON TO 102M & 103M

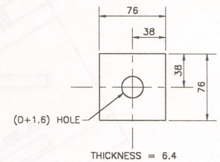
SHEET___of___



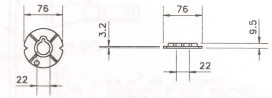

LAG SCREW



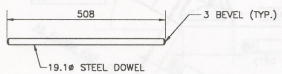

DOME HEAD BOLT



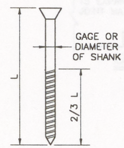

6.4 PLATE WASHER




MALLEABLE IRON WASHER




DRIFT PIN




WOOD SCREW

**NOTE:**

STANDARD BOLTS, NUTS, AND WASHER NOT SHOWN.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

TYPICAL HARDWARE DETAILS

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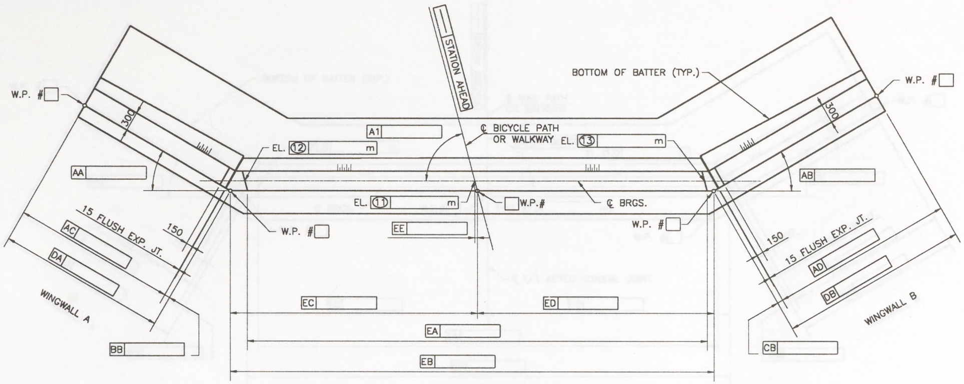
ENGINEER'S SEAL

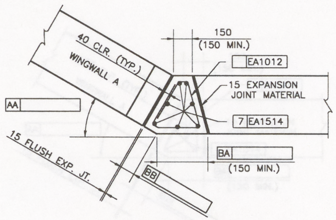
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 104M | 4 | SHT.'S COMMON TO 102M &103M |

SHEET____of____



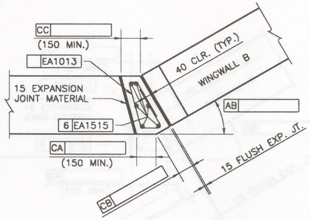

ABUTMENT PLAN

NO SCALE




CHEEKWALL A DETAIL

NO SCALE

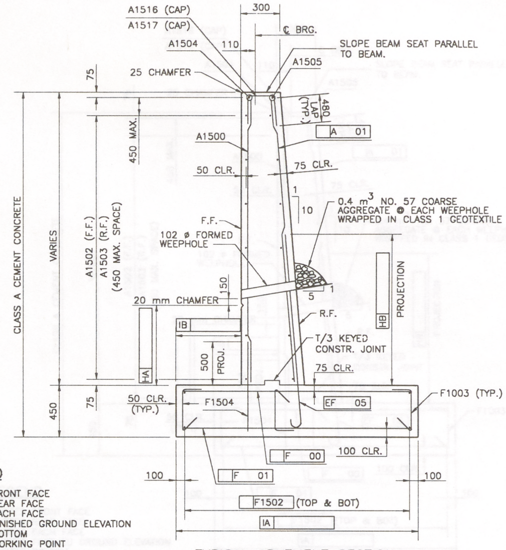



CHEEKWALL B DETAIL

NO SCALE

## LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

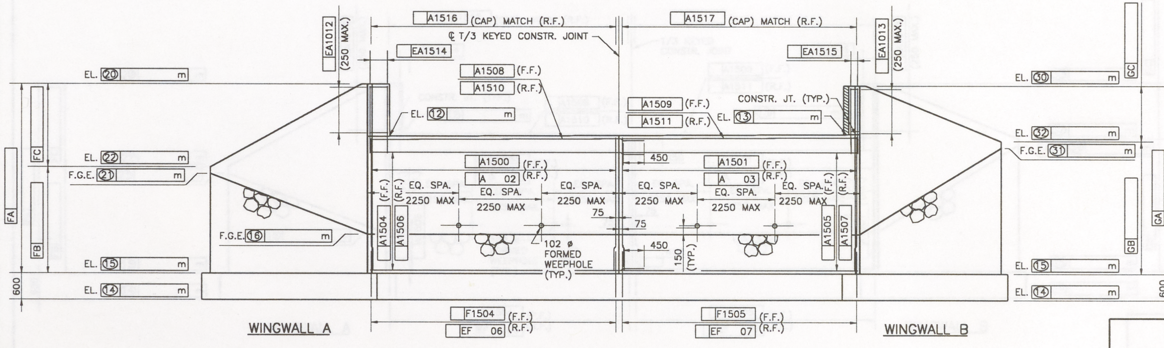



TYPICAL ABUTMENT SECTION

NO SCALE

## NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ FOOTING PLAN SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = ___ MPa.
- MAX DESIGN FOUNDATION PRESSURE = ___ MPa.




ABUTMENT ELEVATION

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| REVISIONS | | | | | |

ABUTMENT___ - LEFT SKEW

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STATE COLLEGE, PA

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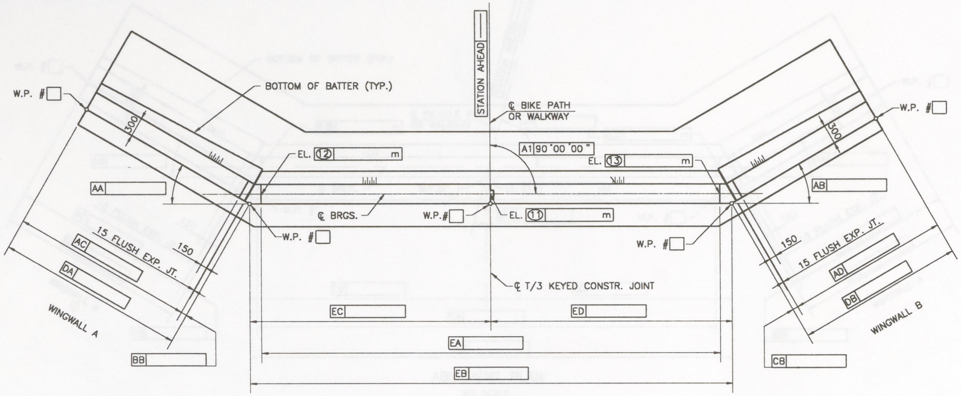
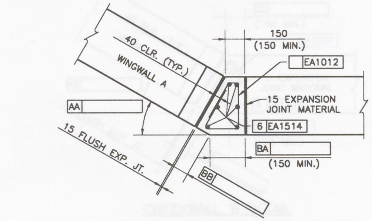
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 105M | 1 | SPREAD FOOTING ABUTMENT |

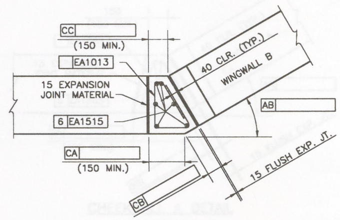
SHEET___of___



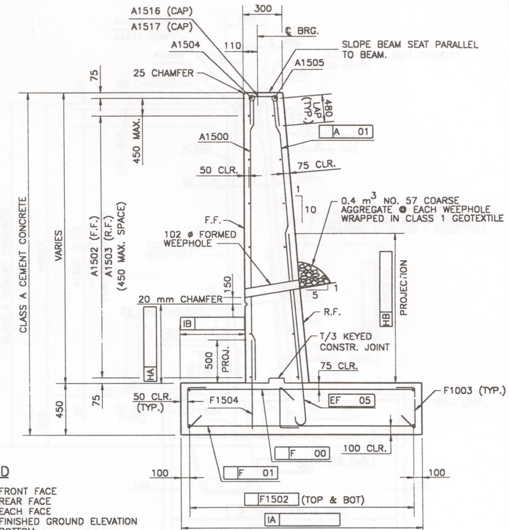

ABUTMENT PLAN
NO SCALE




CHEEKWALL A DETAIL
NO SCALE




CHEEKWALL B DETAIL
NO SCALE



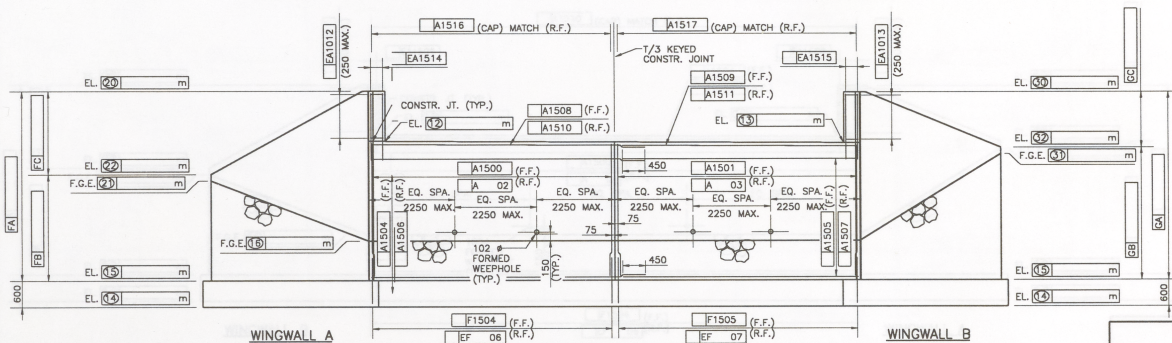

TYPICAL ABUTMENT SECTION
NO SCALE

## LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

## NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ FOOTING PLAN SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = ___ MPa.
- MAX DESIGN FOUNDATION PRESSURE = ___ MPa.




ABUTMENT ELEVATION
NO SCALE

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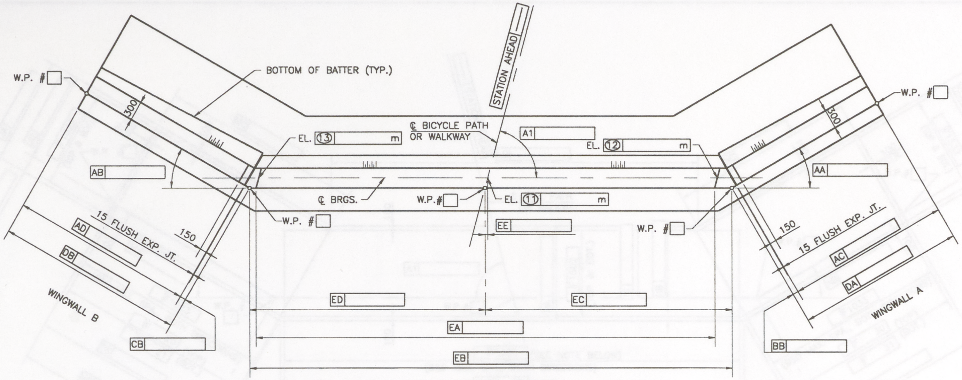
| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | REVISIONS | | | | |

ENGINEER'S SEAL

ABUTMENT ___ - 90° SKEW

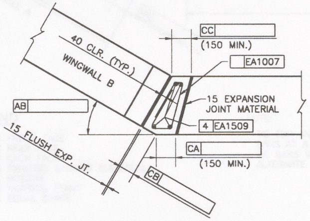
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 105M | 2 | SPREAD FOOTING ABUTMENT |

SHEET___of___



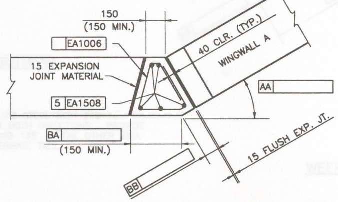

ABUTMENT PLAN

NO SCALE



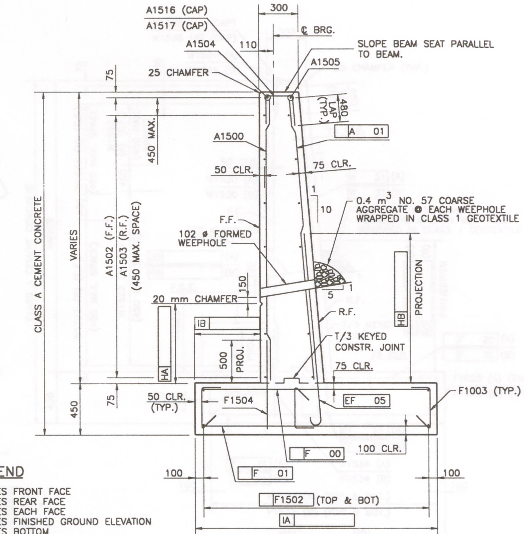

CHEEKWALL B DETAIL

NO SCALE




CHEEKWALL A DETAIL

NO SCALE




TYPICAL ABUTMENT SECTION

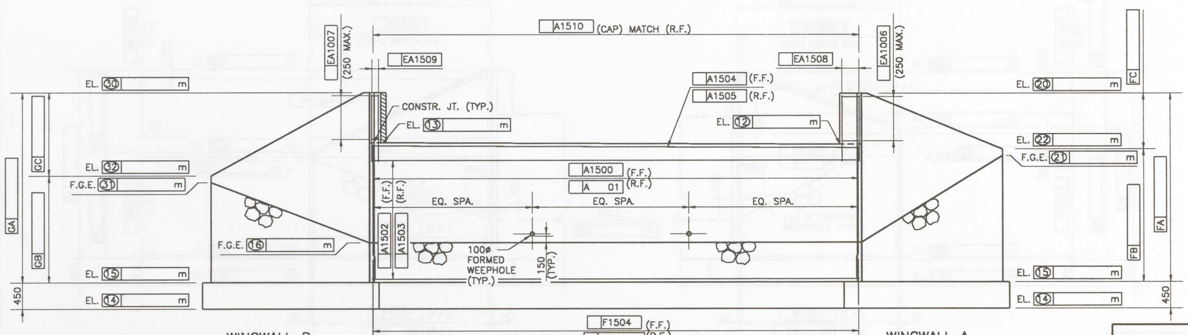
NO SCALE

## LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

## NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ FOOTING PLAN SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = ____ MPa.
- MAX DESIGN FOUNDATION PRESSURE = ____ MPa.




ABUTMENT ELEVATION

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| REVISIONS | | | | | |

ABUTMENT ____ – RIGHT SKEW

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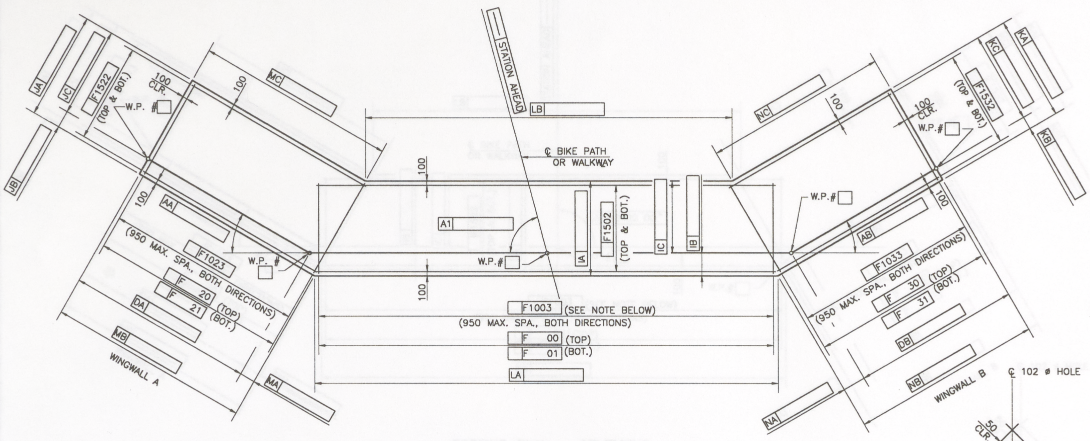
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 105M | 3 | SPREAD FOOTING ABUTMENT |

SHEET ____ of ____




## FOOTING PLAN – ABUTMENT

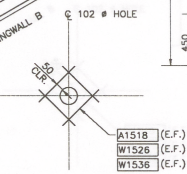
NO SCALE

NOTE:

TIE TOP AND BOTTOM MATS OF REINFORCING STEEL WITH #10 TIE BARS AT A MAXIMUM SPACING OF 950 IN BOTH DIRECTIONS. PROVIDE TIE BARS WITH 90° HOOK AT ONE END AND 135° AT THE OTHER END. ALTERNATE 90° AND 135° AT TOP IN ALTERNATE TIES.

## LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

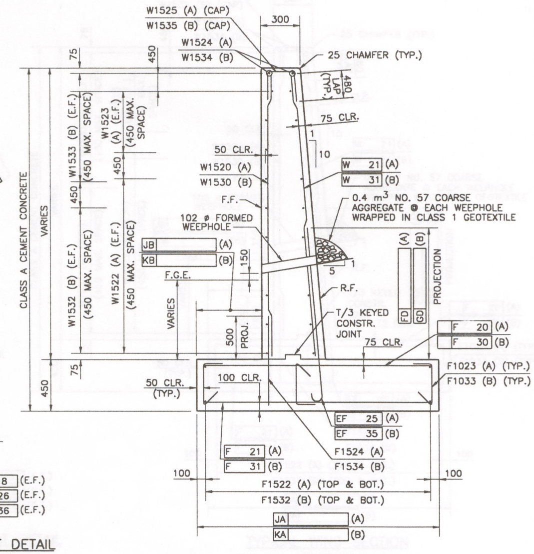



## WEEPHOLE REINFORCEMENT DETAIL

NO SCALE

NOTE:

ADJUST REINFORCEMENT AS NECESSARY TO ACCOMMODATE OPENING.

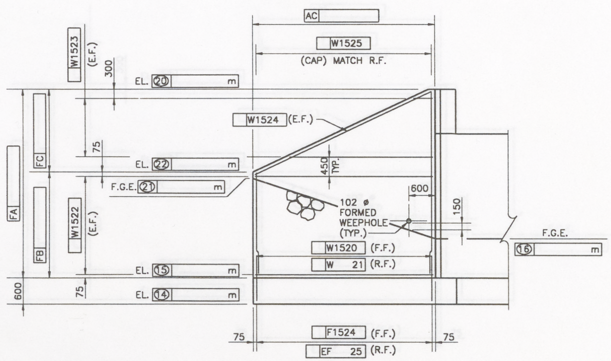



## TYPICAL WING SECTION

NO SCALE

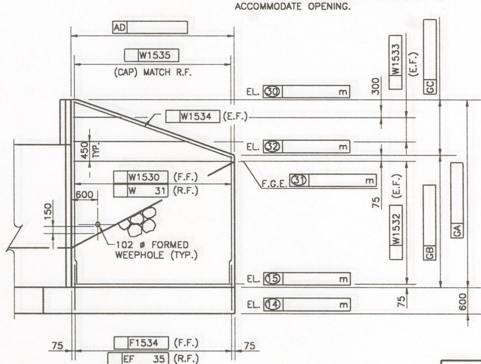
## NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF WINGWALLS SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ , SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = ___ MPa
- MAX DESIGN FOUNDATION PRESSURE = WING A = ___ MPa
  WING B = ___ MPa




## WINGWALL A

NO SCALE




## WINGWALL B

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| REVISIONS | | | | | |

ABUTMENT ___ – FTG. PLAN – LEFT SKEW

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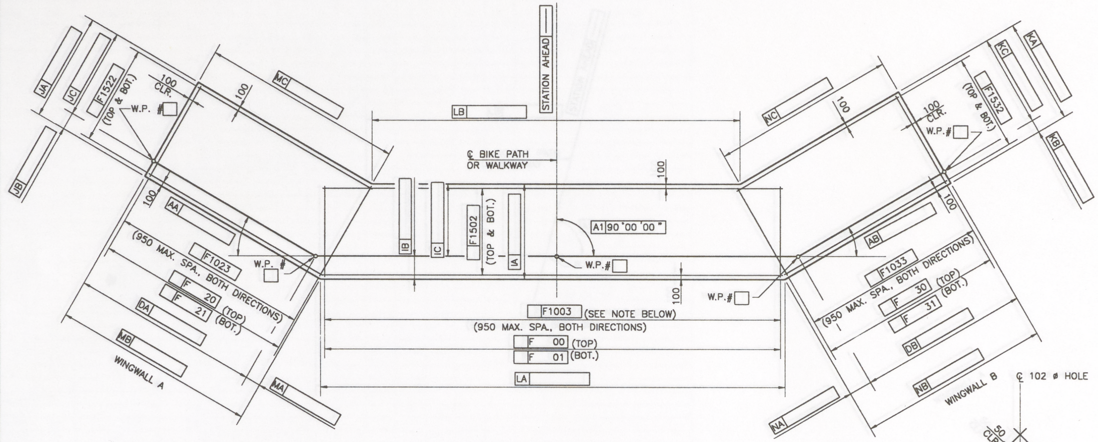
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 105M | 4 | SPREAD FOOTING ABUTMENT |

SHEET ___ of ___




## FOOTING PLAN – ABUTMENT

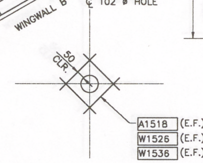
NO SCALE

NOTE:

TIE TOP AND BOTTOM MATS OF REINFORCING STEEL WITH #10 TIE BARS AT A MAXIMUM SPACING OF 950 IN BOTH DIRECTIONS. PROVIDE TIE BARS WITH 90° HOOK AT ONE END AND 135° AT THE OTHER END. ALTERNATE 90° AND 135° AT TOP IN ALTERNATE TIES.

## LEGEND

- F.F. DENOTES FRONT FACE
- R.F. DENOTES REAR FACE
- E.F. DENOTES EACH FACE
- F.G.E. DENOTES FINISHED GROUND ELEVATION
- BOT. DENOTES BOTTOM
- W.P. DENOTES WORKING POINT
- EQ. SPA. DENOTES EQUAL SPACE

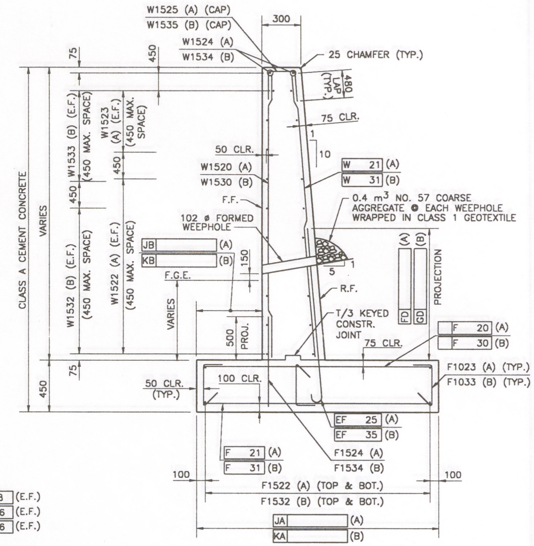



## WEEPHOLE REINFORCEMENT DETAIL

NO SCALE

NOTE:

ADJUST REINFORCEMENT AS NECESSARY TO ACCOMMODATE OPENING.

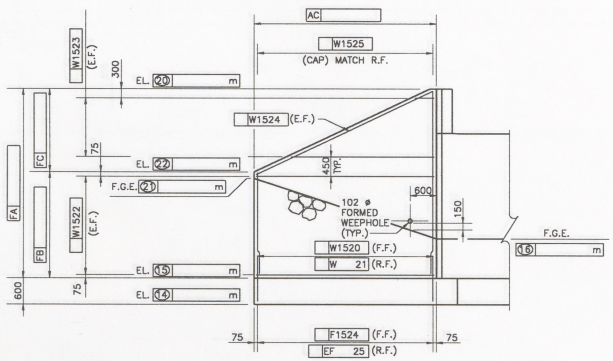



## TYPICAL WING SECTION

NO SCALE

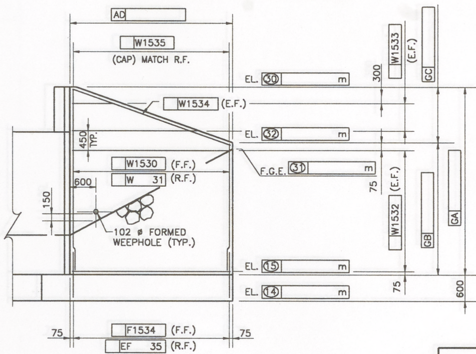
## NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF WINGWALLS SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ , SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = ___ MPa
- MAX DESIGN FOUNDATION PRESSURE = WING A OR C = ___ MPa
  WING B OR D = ___ MPa




## WINGWALL A

NO SCALE




## WINGWALL B

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | REVISIONS | | | | |

ABUTMENT ___ – FTG. PLAN – 90° SKEW

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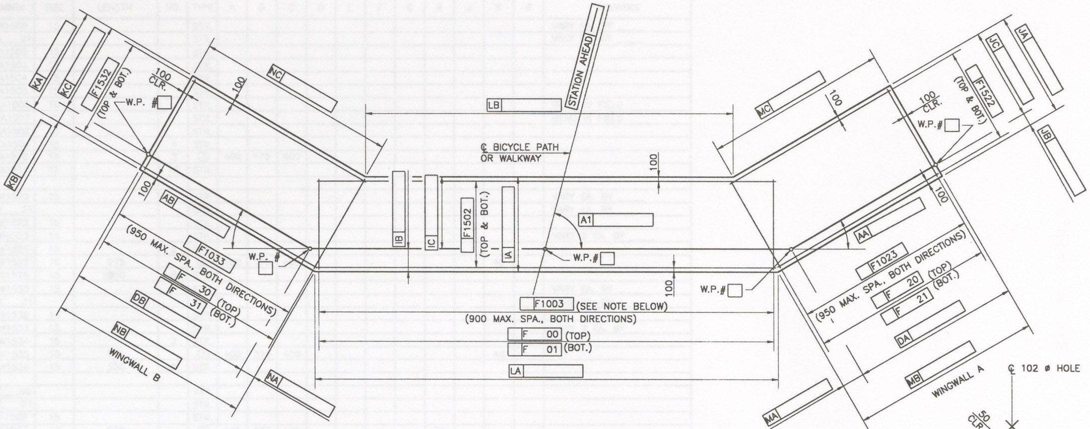
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 105M | 5 | SPREAD FOOTING ABUTMENT |

SHEET ___ of ___




## FOOTING PLAN – ABUTMENT

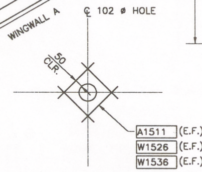
NO SCALE

## LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

NOTE:

TIE TOP AND BOTTOM MATS OF REINFORCING STEEL WITH #10 TIE BARS AT A MAXIMUM SPACING OF 950 IN BOTH DIRECTIONS. PROVIDE TIE BARS WITH 90° HOOK AT ONE END AND 135° AT THE OTHER END. ALTERNATE 90° AND 135° AT TOP IN ALTERNATE TIES.

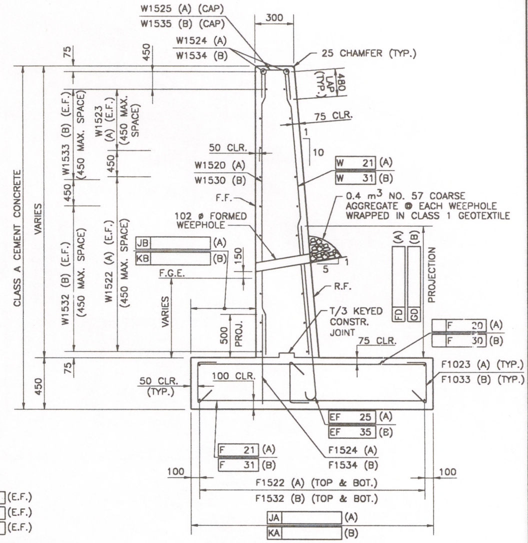



## WEEPHOLE REINFORCEMENT DETAIL

NO SCALE

NOTE:

ADJUST REINFORCEMENT AS NECESSARY TO ACCOMMODATE OPENING.

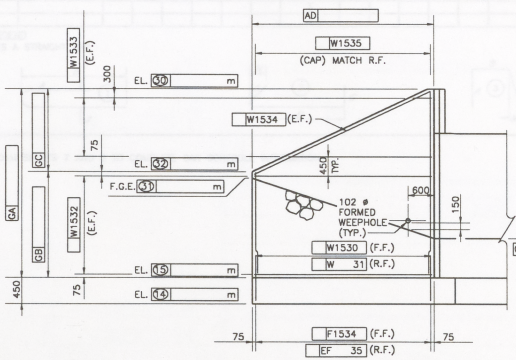



## TYPICAL WING SECTION

NO SCALE

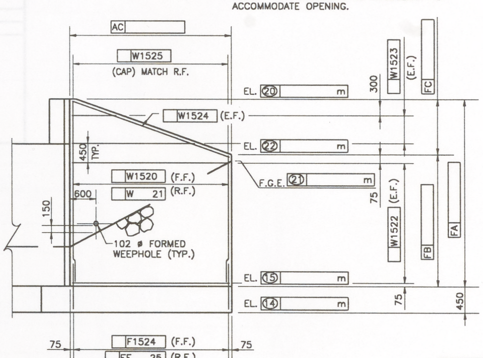
## NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF WINGWALLS SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ , SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = _____ MPa
- MAX DESIGN FOUNDATION PRESSURE = WING A OR C = ____ MPa; WING B OR D = ____ MPa




## WINGWALL B

NO SCALE




## WINGWALL A

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

REVISIONS

ABUTMENT ___ – FTG. PLAN – RIGHT SKEW

PREPARED BY: POWERS & SCHRAM INC. CONSULTING ENGINEERS STATE COLLEGE, PA

THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 105M | 6 | SPREAD FOOTING ABUTMENT |

SHEET___of___

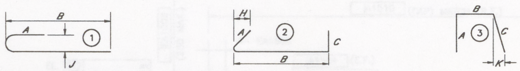
# REINFORCEMENT BAR SCHEDULE*

(REINFORCEMENT BAR SCHEDULE IS FOR INFORMATION ONLY. VERIFY IT PRIOR TO BIDDING AND FABRICATION)

| MARK | SIZE | LENGTH | NO. | TYPE | A | B | C | D | E | F | G | H | J | K | R | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1500 | 15 | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| A___01 | | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| A1502 | 15 | | | STR. | | | | | | | | | | | | |
| A1503 | 15 | | | STR. | | | | | | | | | | | | |
| A1504 | 15 | | | STR. | | | | | | | | | | | | |
| A1505 | 15 | | | STR. | | | | | | | | | | | | |
| EA1006 | 10 | | | STR. | | | | | | | | | | | | BEND IN FIELD |
| EA1007 | 10 | | | STR. | | | | | | | | | | | | BEND IN FIELD |
| EA1508 | 15 | | | STR. | | | | | | | | | | | | |
| EA1509 | 15 | | 4 | STR. | | | | | | | | | | | | |
| A1510 | 15 | | 3 | 3 | 400 | 175 | 400 | | | | | | | 40 | | |
| A1511 | 15 | | 16 | STR. | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| W1520 | 15 | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| W___21 | | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| W1522 | 15 | | | STR. | | | | | | | | | | | | |
| W1523 | 15 | | | STR. | | | | | | | | | | | | VARY 2 EA. BY ____ |
| W1524 | 15 | | 2 | STR. | | | | | | | | | | | | |
| W1525 | 15 | 975 | | 3 | 400 | 175 | 400 | | | | | | | 40 | | |
| W1526 | 15 | 300 | 8 | STR. | | | | | | | | | | | | |
| W1530 | 15 | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| W___31 | | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| W1532 | 15 | | | STR. | | | | | | | | | | | | |
| W1533 | 15 | | | STR. | | | | | | | | | | | | VARY 2 EA. BY ____ |
| W1534 | 15 | | 2 | STR. | | | | | | | | | | | | |
| W1535 | 15 | 975 | | 3 | 400 | 325 | 400 | | | | | | | 40 | | |
| W1536 | 15 | 300 | 8 | STR. | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| F___00 | | | | STR. | | | | | | | | | | | | |
| F___01 | | | | STR. | | | | | | | | | | | | |
| F1502 | 15 | | | STR. | | | | | | | | | | | | |
| F1003 | 10 | 550 | | 2 | 125 | 450 | 125 | | | | | 75 | | | | |
| F1504 | 15 | 900 | | STR. | | | | | | | | | | | | |
| EF___06 | | | | 1 | | | | | | | | | | | | |
| F___20 | | | | STR. | | | | | | | | | | | | |
| F___21 | | | | STR. | | | | | | | | | | | | |
| F1522 | 15 | | | STR. | | | | | | | | | | | | |
| F1023 | 10 | 700 | | 2 | 125 | 450 | 125 | | | | | 75 | | | | |
| F1524 | 15 | 900 | | STR. | | | | | | | | | | | | |
| EF___25 | | | | 1 | | | | | | | | | | | | |
| F___30 | | | | STR. | | | | | | | | | | | | |
| F___31 | | | | STR. | | | | | | | | | | | | |
| F1532 | 15 | | | STR. | | | | | | | | | | | | |
| F1033 | 10 | 700 | | 2 | 125 | 450 | 125 | | | | | 75 | | | | |
| F1534 | 15 | 900 | | STR. | | | | | | | | | | | | |
| EF___35 | | | | 1 | | | | | | | | | | | | |

BAR TYPE LEGEND

STR. DENOTES A STRAIGHT BAR




* USE 101M SHEETS 7 AND 8 TO COMPLETE BAR SCHEDULE INFORMATION.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

ABUTMENT ____ BAR SCHEDULE

PREPARED BY:

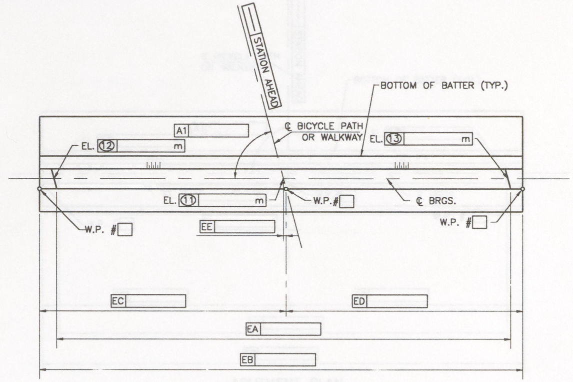
Powers & Schram Inc.
CONSULTING ENGINEERS
STATE COLLEGE, PA

THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

ENGINEER'S SEAL

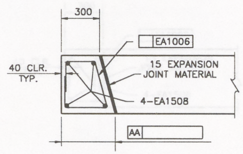
SERIES NO: 105M | SHEET NO: 7 | SERIES TITLE: SPREAD FOOTING ABUTMENT

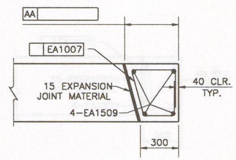
SHEET____of____




ABUTMENT PLAN

NO SCALE



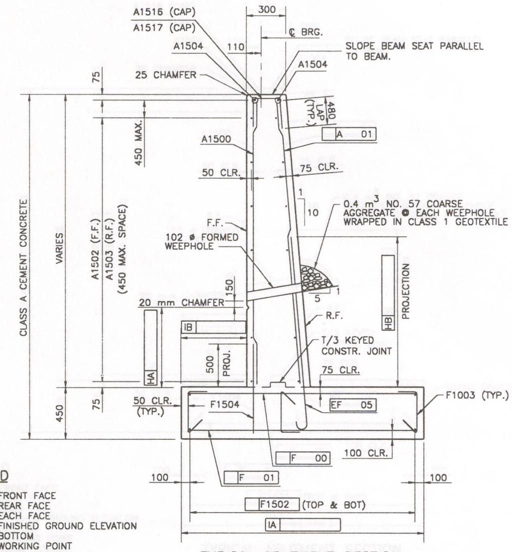




CHEEKWALL A DETAIL

NO SCALE

CHEEKWALL B DETAIL

NO SCALE




TYPICAL ABUTMENT SECTION

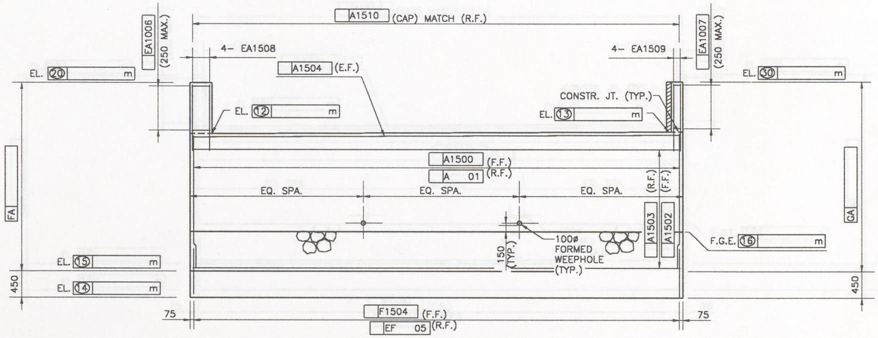
NO SCALE

## LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

## NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ FOOTING PLAN SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = ____ MPa.
- MAX DESIGN FOUNDATION PRESSURE = ____ MPa.




ABUTMENT ELEVATION

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

REVISIONS

ABUTMENT ____ – LEFT SKEW

PREPARED BY:
POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

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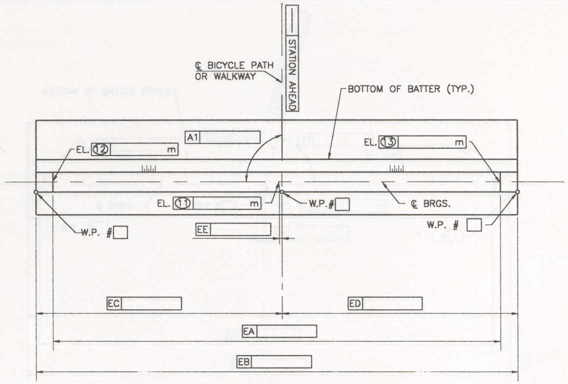
ENGINEER'S SEAL

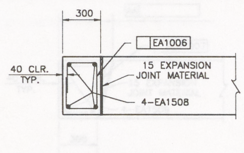
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 106M | 1 | SPREAD FOOTING ABUTMENT W/O WINGWALLS |

SHEET____of____



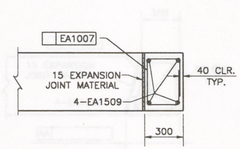

ABUTMENT PLAN

NO SCALE



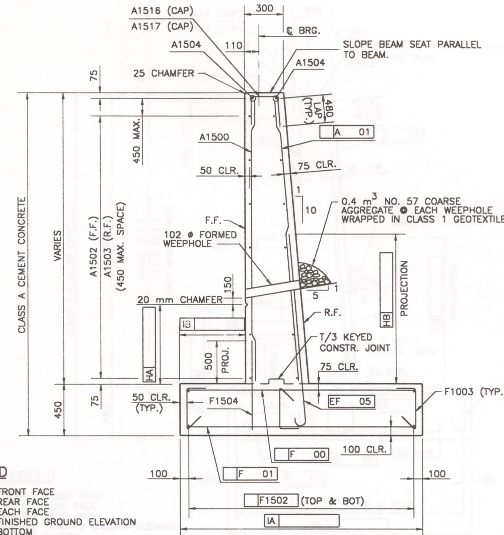

CHEEKWALL A DETAIL

NO SCALE




CHEEKWALL B DETAIL

NO SCALE




TYPICAL ABUTMENT SECTION

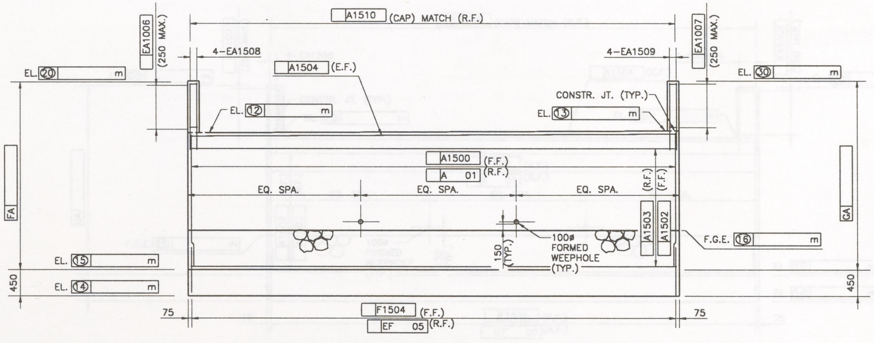
NO SCALE

LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ FOOTING PLAN SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = ___ MPa.
- MAX DESIGN FOUNDATION PRESSURE = ___ MPa.




ABUTMENT ELEVATION

NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

REVISIONS

ABUTMENT ___ - 90° SKEW

PREPARED BY:

POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

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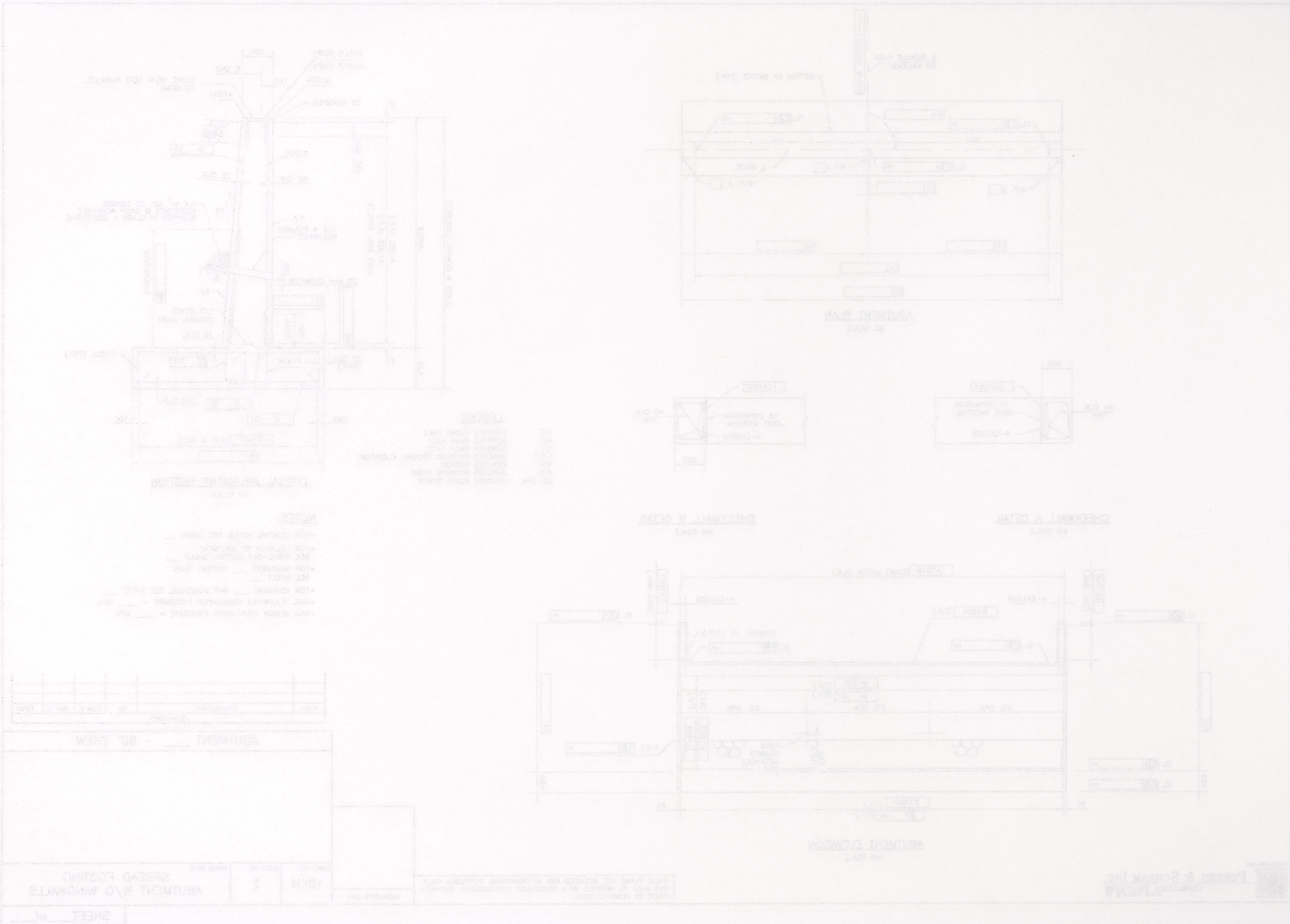
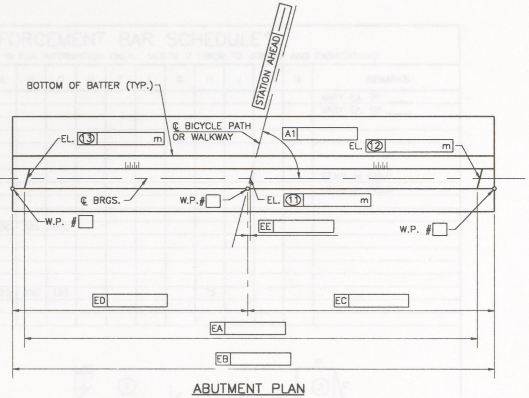
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 106M | 2 | SPREAD FOOTING ABUTMENT W/O WINGWALLS |

SHEET___of___

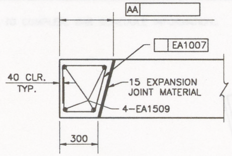


TYPICAL ABUTMENT SECTION
NO SCALE
LEGEND
NOTES
*FOR GENERAL NOTES SEE SHEET ___
*FOR LOCATION OF ABUTMENT SEE STAKE-OUT CONTROL SHEET ___
*FOR ABUTMENT ___ FOOTING PLAN SEE SHEET ___
*FOR ABUTMENT ___ BAR SCHEDULE SEE SHEET ___
*MAX. ALLOWABLE FOUNDATION PRESSURE = ___ kPa
*MAX DESIGN FOUNDATION PRESSURE = ___ kPa
ABUTMENT PLAN
NO SCALE
CHEEKWALL B DETAIL
NO SCALE
CHEEKWALL A DETAIL
NO SCALE
ABUTMENT ELEVATION
NO SCALE
ABUTMENT ___ - 90° SKEW
SPREAD FOOTING
ABUTMENT W/O WINGWALLS
2
SHEET ___ of ___
POWERS & SCHRAM INC.



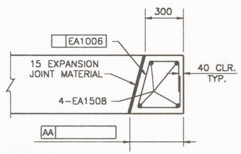

ABUTMENT PLAN

NO SCALE



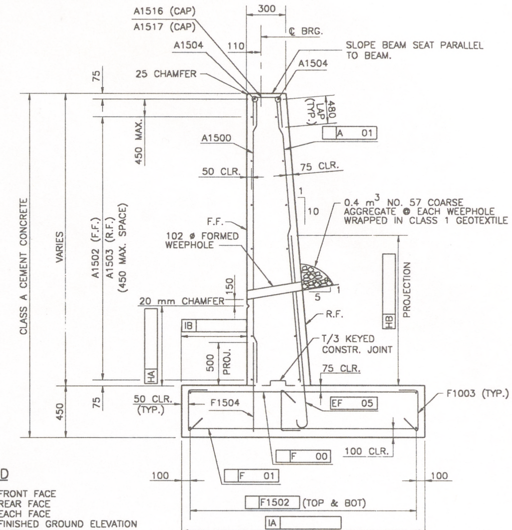

CHEEKWALL B DETAIL

NO SCALE




CHEEKWALL A DETAIL

NO SCALE




TYPICAL ABUTMENT SECTION

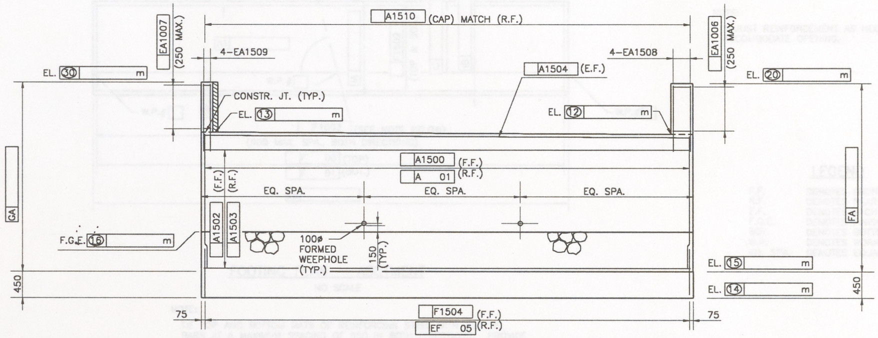
NO SCALE

## LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

## NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ FOOTING PLAN SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = ___ MPa.
- MAX DESIGN FOUNDATION PRESSURE = ___ MPa.




ABUTMENT ELEVATION

NO SCALE

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Mark | Description | By | Chk'd | App'd | Date |
| REVISIONS | | | | | |

ABUTMENT ___ - RIGHT SKEW

ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 106M | 3 | SPREAD FOOTING ABUTMENT W/O WINGWALLS |

SHEET___of___

THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

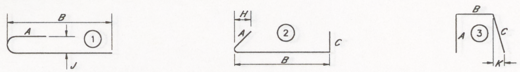
## REINFORCEMENT BAR SCHEDULE*

(REINFORCEMENT BAR SCHEDULE IS FOR INFORMATION ONLY. VERIFY IT PRIOR TO BIDDING AND FABRICATION)

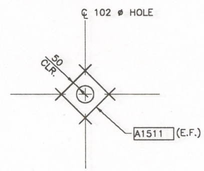
| MARK | SIZE | LENGTH | NO. | TYPE | A | B | C | D | E | F | G | H | J | K | R | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1500 | 15 | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| A___01 | | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| A1502 | 15 | | | STR. | | | | | | | | | | | | |
| A1503 | 15 | | | STR. | | | | | | | | | | | | |
| A1504 | 15 | | | STR. | | | | | | | | | | | | |
| A1505 | 15 | | | STR. | | | | | | | | | | | | |
| EA1006 | 10 | | | STR. | | | | | | | | | | | | BEND IN FIELD |
| EA1007 | 10 | | | STR. | | | | | | | | | | | | BEND IN FIELD |
| EA1508 | 15 | | 4 | STR. | | | | | | | | | | | | |
| EA1509 | 15 | | 4 | STR. | | | | | | | | | | | | |
| A1510 | 15 | | | 3 | 400 | 325 | 400 | | | | | | | 40 | | |
| A1511 | 15 | | | STR. | | | | | | | | | | | | |
| F___00 | | | | STR. | | | | | | | | | | | | |
| F___01 | | | | STR. | | | | | | | | | | | | |
| F1502 | 15 | | | STR. | | | | | | | | | | | | |
| F1003 | 10 | 700 | | 2 | 125 | 450 | 125 | | | | | 75 | | | | |
| F1504 | 15 | 1050 | | STR. | | | | | | | | | | | | |
| EF___06 | | | | 1 | | | | | | | | | | | | |

BAR TYPE LEGEND

STR. DENOTES A STRAIGHT BAR




* USE 101M SHEETS 11 AND 12 TO COMPLETE BAR SCHEDULE INFORMATION.




### WEEPHOLE REINFORCEMENT DETAIL

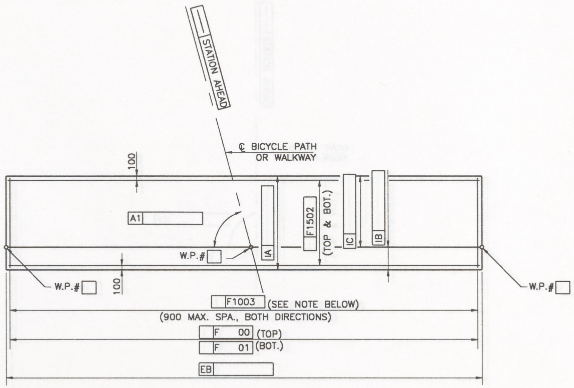
NO SCALE

NOTE:

ADJUST REINFORCEMENT AS NECESSARY TO ACCOMMODATE OPENING.

### NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF WINGWALLS SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ , SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = ____ MPa




### FOOTING PLAN – ABUTMENT

NO SCALE

NOTE:

TIE TOP AND BOTTOM MATS OF REINFORCING STEEL WITH #10 TIE BARS AT A MAXIMUM SPACING OF 950 IN BOTH DIRECTIONS. PROVIDE TIE BARS WITH 90° HOOK AT ONE END AND 135° AT THE OTHER END. ALTERNATE 90° AND 135° AT TOP IN ALTERNATE TIES.

### LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| REVISIONS | | | | | |

ABUTMENT ___ – FTG. PLAN – LEFT SKEW


PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA




ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 106M | 4 | SPREAD FOOTING ABUTMENT W/O WINGWALLS |

SHEET___of___

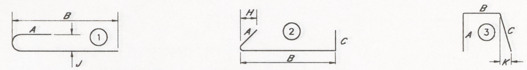
# REINFORCEMENT BAR SCHEDULE*

(REINFORCEMENT BAR SCHEDULE IS FOR INFORMATION ONLY. VERIFY IT PRIOR TO BIDDING AND FABRICATION)

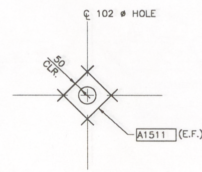
| MARK | SIZE | LENGTH | NO. | TYPE | A | B | C | D | E | F | G | H | J | K | R | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1500 | 15 | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| A___01 | | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| A1502 | 15 | | | STR. | | | | | | | | | | | | |
| A1503 | 15 | | | STR. | | | | | | | | | | | | |
| A1504 | 15 | | | STR. | | | | | | | | | | | | |
| A1505 | 15 | | | STR. | | | | | | | | | | | | |
| EA1006 | 10 | | | STR. | | | | | | | | | | | | BEND IN FIELD |
| EA1007 | 10 | | | STR. | | | | | | | | | | | | BEND IN FIELD |
| EA1508 | 15 | | 4 | STR. | | | | | | | | | | | | |
| EA1509 | 15 | | 4 | STR. | | | | | | | | | | | | |
| A1510 | 15 | | | 3 | 400 | 325 | 400 | | | | | | | 40 | | |
| A1511 | 15 | | | STR. | | | | | | | | | | | | |
| F___00 | | | | STR. | | | | | | | | | | | | |
| F___01 | | | | STR. | | | | | | | | | | | | |
| F1502 | 15 | | | STR. | | | | | | | | | | | | |
| F1003 | 10 | 700 | | 2 | 125 | 450 | 125 | | | | | 75 | | | | |
| F1504 | 15 | 1050 | | STR. | | | | | | | | | | | | |
| EF___06 | | | | 1 | | | | | | | | | | | | |

BAR TYPE LEGEND

STR. DENOTES A STRAIGHT BAR




* USE 101M SHEETS 11 AND 12 TO COMPLETE BAR SCHEDULE INFORMATION.




## WEEPHOLE REINFORCEMENT DETAIL

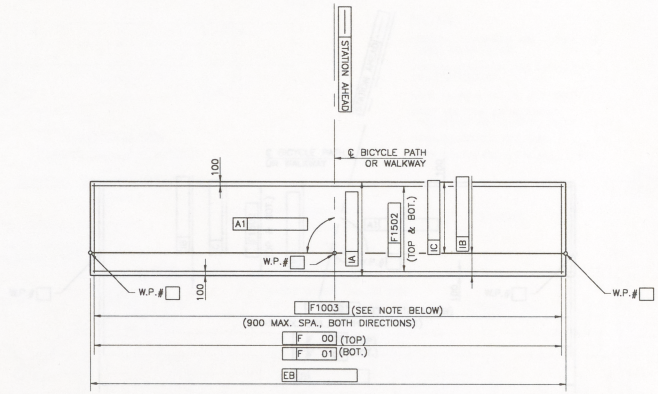
NO SCALE

NOTE:

ADJUST REINFORCEMENT AS NECESSARY TO ACCOMMODATE OPENING.

## NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF WINGWALLS SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ , SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = ____ MPa




## FOOTING PLAN – ABUTMENT

NO SCALE

NOTE:

TIE TOP AND BOTTOM MATS OF REINFORCING STEEL WITH #10 TIE BARS AT A MAXIMUM SPACING OF 950 IN BOTH DIRECTIONS. PROVIDE TIE BARS WITH 90° HOOK AT ONE END AND 135° AT THE OTHER END. ALTERNATE 90° AND 135° AT TOP IN ALTERNATE TIES.

## LEGEND

| | |
|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

REVISIONS

ABUTMENT ____ – FTG. PLAN – 90° SKEW


PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA




ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 106M | 5 | SPREAD FOOTING ABUTMENT W/O WINGWALLS |

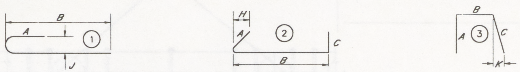
# REINFORCEMENT BAR SCHEDULE*

(REINFORCEMENT BAR SCHEDULE IS FOR INFORMATION ONLY. VERIFY IT PRIOR TO BIDDING AND FABRICATION)

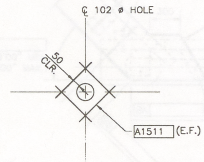
| MARK | SIZE | LENGTH | NO. | TYPE | A | B | C | D | E | F | G | H | J | K | R | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1500 | 15 | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| A___01 | | | | STR. | | | | | | | | | | | | VARY EA. BY ____ |
| A1502 | 15 | | | STR. | | | | | | | | | | | | |
| A1503 | 15 | | | STR. | | | | | | | | | | | | |
| A1504 | 15 | | | STR. | | | | | | | | | | | | |
| A1505 | 15 | | | STR. | | | | | | | | | | | | |
| EA1006 | 10 | | | STR. | | | | | | | | | | | | BEND IN FIELD |
| EA1007 | 10 | | | STR. | | | | | | | | | | | | BEND IN FIELD |
| EA1508 | 15 | | 4 | STR. | | | | | | | | | | | | |
| EA1509 | 15 | | 4 | STR. | | | | | | | | | | | | |
| A1510 | 15 | | | 3 | 400 | 325 | 400 | | | | | | | 40 | | |
| A1511 | 15 | | | STR. | | | | | | | | | | | | |
| F___00 | | | | STR. | | | | | | | | | | | | |
| F___01 | | | | STR. | | | | | | | | | | | | |
| F1502 | 15 | | | STR. | | | | | | | | | | | | |
| F1003 | 10 | 700 | | 2 | 125 | 450 | 125 | | | | | 75 | | | | |
| F1504 | 15 | 1050 | | STR. | | | | | | | | | | | | |
| EF___06 | | | | 1 | | | | | | | | | | | | |

BAR TYPE LEGEND

STR. DENOTES A STRAIGHT BAR




* USE 101M SHEETS 11 AND 12 TO COMPLETE BAR SCHEDULE INFORMATION.




## WEEPHOLE REINFORCEMENT DETAIL

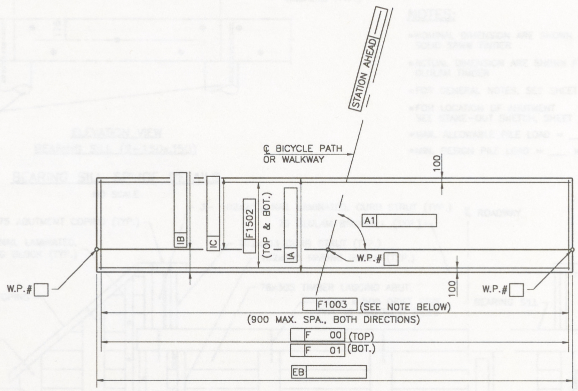
NO SCALE

NOTE:

ADJUST REINFORCEMENT AS NECESSARY TO ACCOMMODATE OPENING.

## NOTES:

- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF WINGWALLS SEE STAKE-OUT SKETCH, SHEET ___
- FOR ABUTMENT ___ , SEE SHEET ___
- FOR ABUTMENT ___ BAR SCHEDULE, SEE SHEET ___
- MAX. ALLOWABLE FOUNDATION PRESSURE = _____ MPa




## FOOTING PLAN – ABUTMENT

NO SCALE

NOTE:

TIE TOP AND BOTTOM MATS OF REINFORCING STEEL WITH #10 TIE BARS AT A MAXIMUM SPACING OF 950 IN BOTH DIRECTIONS. PROVIDE TIE BARS WITH 90° HOOK AT ONE END AND 135° AT THE OTHER END. ALTERNATE 90° AND 135° AT TOP IN ALTERNATE TIES.

## LEGEND

| | | |
|---|---|---|
| F.F. | DENOTES FRONT FACE |
| R.F. | DENOTES REAR FACE |
| E.F. | DENOTES EACH FACE |
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| BOT. | DENOTES BOTTOM |
| W.P. | DENOTES WORKING POINT |
| EQ. SPA. | DENOTES EQUAL SPACE |

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

REVISIONS

ABUTMENT ___ – FTG. PLAN – RIGHT SKEW

PREPARED BY:

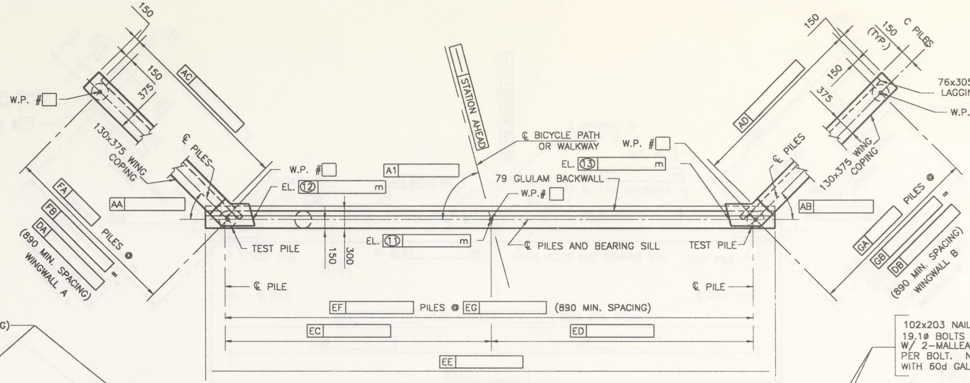
POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

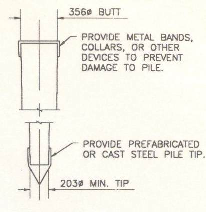
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 106M | 6 | SPREAD FOOTING ABUTMENT W/O WINGWALLS |

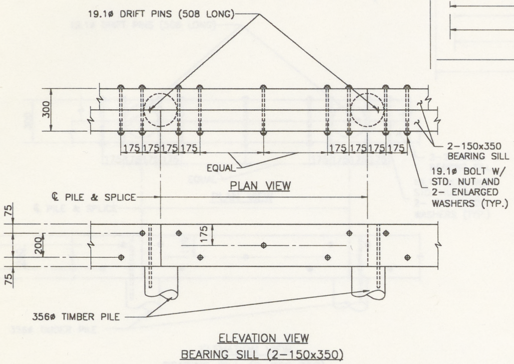
SHEET___of___




ABUTMENT PLAN
NO SCALE




TYP. PILE DETAIL
NO SCALE



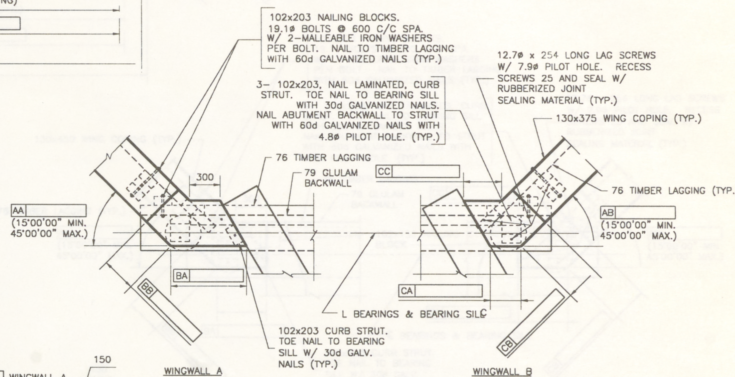

BEARING SILL SPLICE DETAILS
NO SCALE

## LEGEND

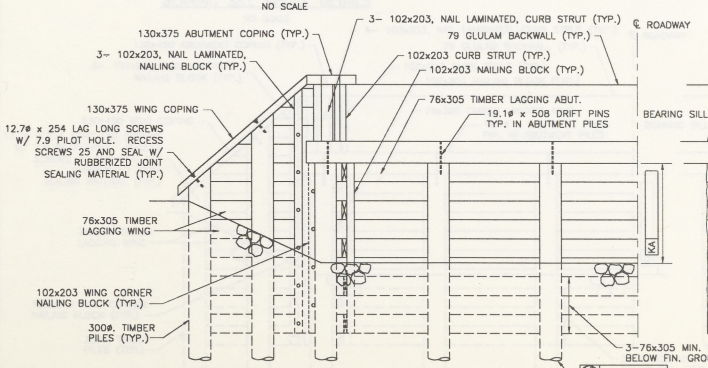
F.G.E. DENOTES FINISHED GROUND ELEVATION
W.P. DENOTES WORKING POINT

## NOTES:

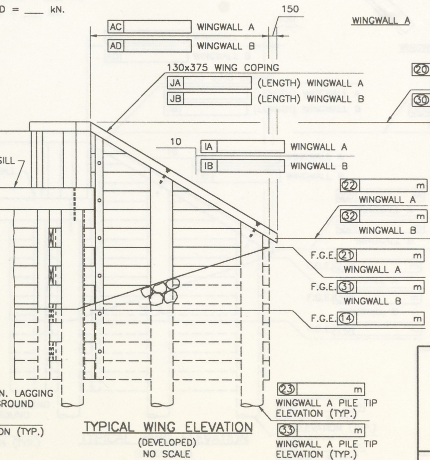
- NOMINAL DIMENSION ARE SHOWN FOR SOLID SAWN TIMBER
- ACTUAL DIMENSION ARE SHOWN FOR GLULAM TIMBER
- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ___
- MAX. ALLOWABLE PILE LOAD = ___ kN.
- MIN. DESIGN PILE LOAD = ___ kN.




SKEWED CORNER DETAIL
NO SCALE




HALF ELEVATION
(DEVELOPED)
NO SCALE




TYPICAL WING ELEVATION
(DEVELOPED)
NO SCALE

THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

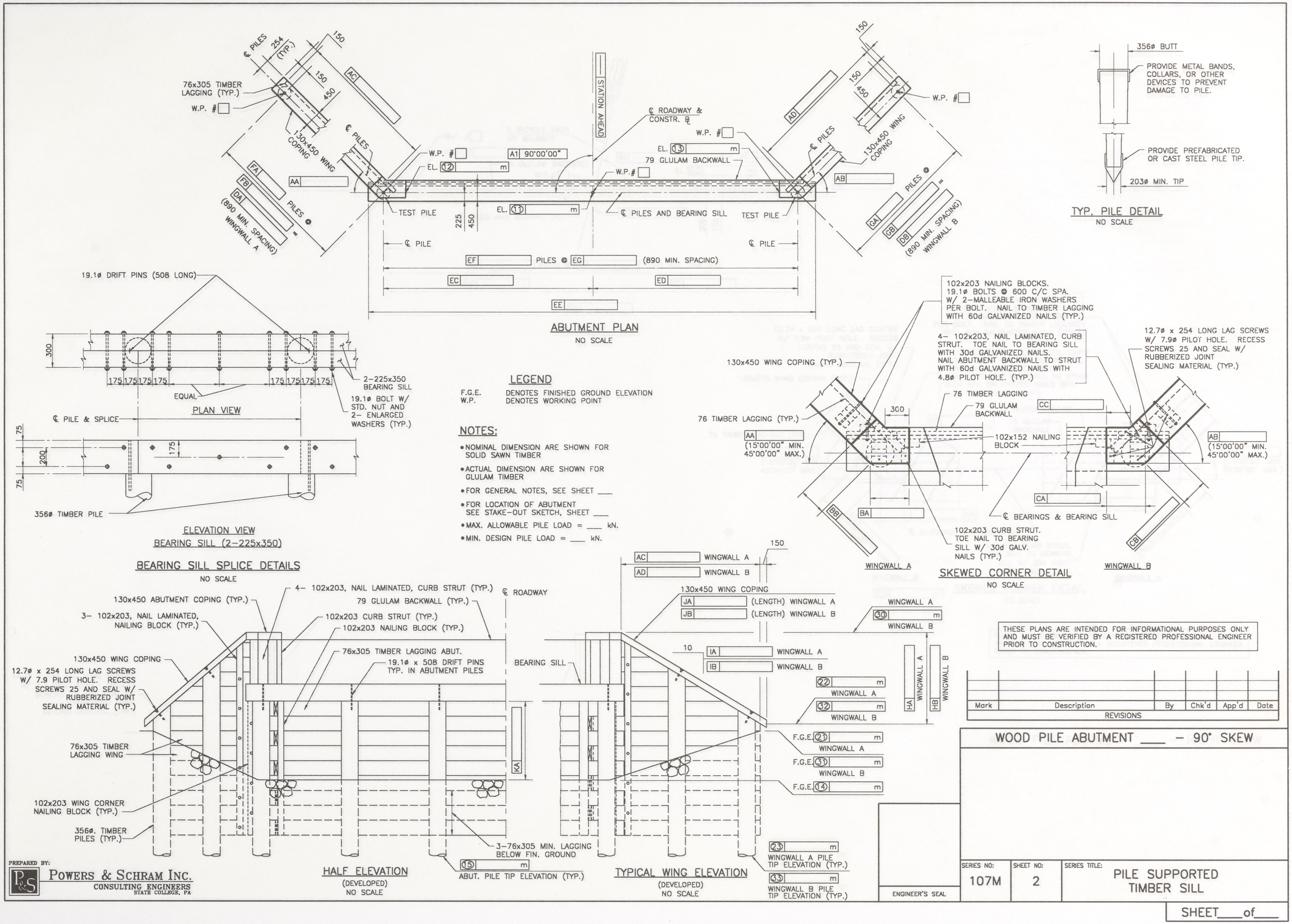
WOOD PILE ABUTMENT ___ – LEFT SKEW

ENGINEER'S SEAL

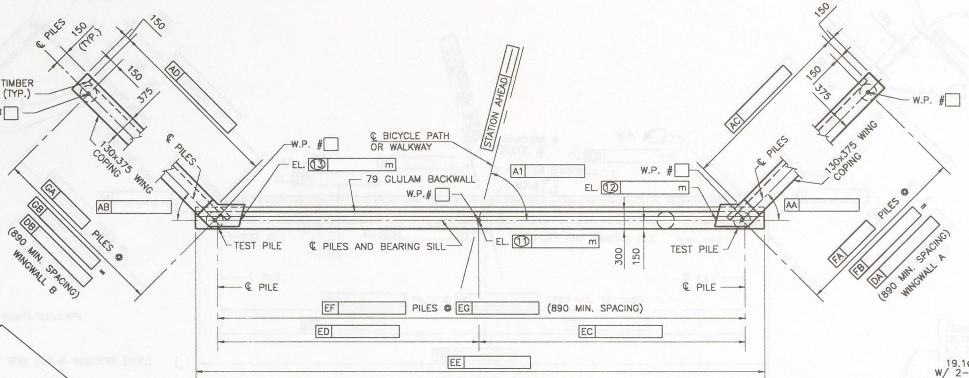
| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 107M | 1 | PILE SUPPORTED TIMBER SILL |

SHEET___of___

PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

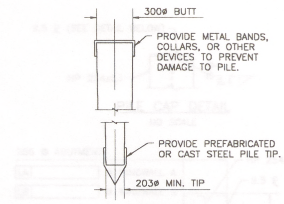


ABUTMENT PLAN
NO SCALE
STATION AHEAD
℄ ROADWAY & CONSTR. ℄
A1 90°00'00"
76x305 TIMBER LAGGING (TYP.)
W.P. #
130x450 WING COPING
℄ PILES
254 (TYP.)
150
450
EL. 12 m
EL. 13 m
EL. 11 m
79 GLULAM BACKWALL
TEST PILE
℄ PILES AND BEARING SILL
℄ PILE
EF PILES @ EG (890 MIN. SPACING)
EC
ED
EE
AA
AB
AC
AD
FA
FB
DA
GA
GB
DB
PILES @ (890 MIN. SPACING) WINGWALL A
PILES @ (890 MIN. SPACING) WINGWALL B
225
TYP. PILE DETAIL
NO SCALE
356ø BUTT
PROVIDE METAL BANDS, COLLARS, OR OTHER DEVICES TO PREVENT DAMAGE TO PILE.
PROVIDE PREFABRICATED OR CAST STEEL PILE TIP.
203ø MIN. TIP
19.1ø DRIFT PINS (508 LONG)
300
175 175 175 175
175 175 175 175
EQUAL
2–225x350 BEARING SILL
19.1ø BOLT W/ STD. NUT AND 2– ENLARGED WASHERS (TYP.)
PLAN VIEW
℄ PILE & SPLICE
75
200
75
175
356ø TIMBER PILE
ELEVATION VIEW
BEARING SILL (2–225x350)
BEARING SILL SPLICE DETAILS
NO SCALE
LEGEND
F.G.E. DENOTES FINISHED GROUND ELEVATION
W.P. DENOTES WORKING POINT
NOTES:
• NOMINAL DIMENSION ARE SHOWN FOR SOLID SAWN TIMBER
• ACTUAL DIMENSION ARE SHOWN FOR GLULAM TIMBER
• FOR GENERAL NOTES, SEE SHEET ___
• FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ___
• MAX. ALLOWABLE PILE LOAD = ___ kN.
• MIN. DESIGN PILE LOAD = ___ kN.
102x203 NAILING BLOCKS. 19.1ø BOLTS @ 600 C/C SPA. W/ 2–MALLEABLE IRON WASHERS PER BOLT. NAIL TO TIMBER LAGGING WITH 60d GALVANIZED NAILS (TYP.)
4– 102x203, NAIL LAMINATED, CURB STRUT. TOE NAIL TO BEARING SILL WITH 30d GALVANIZED NAILS. NAIL ABUTMENT BACKWALL TO STRUT WITH 60d GALVANIZED NAILS WITH 4.8ø PILOT HOLE. (TYP.)
12.7ø x 254 LONG LAG SCREWS W/ 7.9ø PILOT HOLE. RECESS SCREWS 25 AND SEAL W/ RUBBERIZED JOINT SEALING MATERIAL (TYP.)
130x450 WING COPING (TYP.)
76 TIMBER LAGGING
79 GLULAM BACKWALL
300
CC
76 TIMBER LAGGING (TYP.)
AA (15°00'00" MIN. 45°00'00" MAX.)
AB (15°00'00" MIN. 45°00'00" MAX.)
102x152 NAILING BLOCK
CA
BA
BB
CB
℄ BEARINGS & BEARING SILL
102x203 CURB STRUT. TOE NAIL TO BEARING SILL W/ 30d GALV. NAILS (TYP.)
WINGWALL A
WINGWALL B
SKEWED CORNER DETAIL
NO SCALE
130x450 ABUTMENT COPING (TYP.)
4– 102x203, NAIL LAMINATED, CURB STRUT (TYP.)
℄ ROADWAY
79 GLULAM BACKWALL (TYP.)
3– 102x203, NAIL LAMINATED, NAILING BLOCK (TYP.)
102x203 CURB STRUT (TYP.)
102x203 NAILING BLOCK (TYP.)
130x450 WING COPING
76x305 TIMBER LAGGING ABUT.
19.1ø x 508 DRIFT PINS TYP. IN ABUTMENT PILES
12.7ø x 254 LONG LAG SCREWS W/ 7.9 PILOT HOLE. RECESS SCREWS 25 AND SEAL W/ RUBBERIZED JOINT SEALING MATERIAL (TYP.)
76x305 TIMBER LAGGING WING
102x203 WING CORNER NAILING BLOCK (TYP.)
356ø. TIMBER PILES (TYP.)
3–76x305 MIN. LAGGING BELOW FIN. GROUND
15 m
ABUT. PILE TIP ELEVATION (TYP.)
KA
HALF ELEVATION
(DEVELOPED)
NO SCALE
BEARING SILL
150
AC WINGWALL A
AD WINGWALL B
130x450 WING COPING
JA (LENGTH) WINGWALL A
JB (LENGTH) WINGWALL B
10
IA WINGWALL A
IB WINGWALL B
22 m WINGWALL A
32 m WINGWALL B
F.G.E. 21 m WINGWALL A
F.G.E. 31 m WINGWALL B
F.G.E. 14 m
23 m WINGWALL A PILE TIP ELEVATION (TYP.)
33 m WINGWALL B PILE TIP ELEVATION (TYP.)
TYPICAL WING ELEVATION
(DEVELOPED)
NO SCALE
WINGWALL A
30 m
WINGWALL B
HA WINGWALL A
HB WINGWALL B
THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.
Mark Description By Chk'd App'd Date
REVISIONS
WOOD PILE ABUTMENT ___ – 90° SKEW
ENGINEER'S SEAL
SERIES NO: 107M
SHEET NO: 2
SERIES TITLE: PILE SUPPORTED TIMBER SILL
SHEET ___ of ___
PREPARED BY:
P&S
POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA



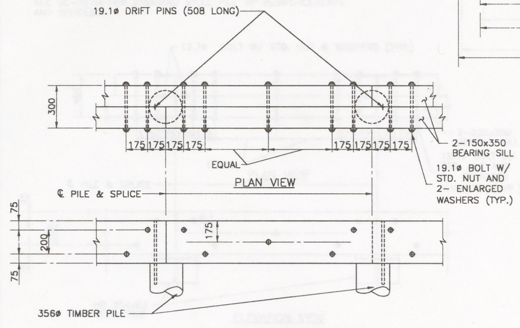

ABUTMENT PLAN

NO SCALE




TYP. PILE DETAIL

NO SCALE




BEARING SILL (2-150x350)

BEARING SILL SPLICE DETAILS

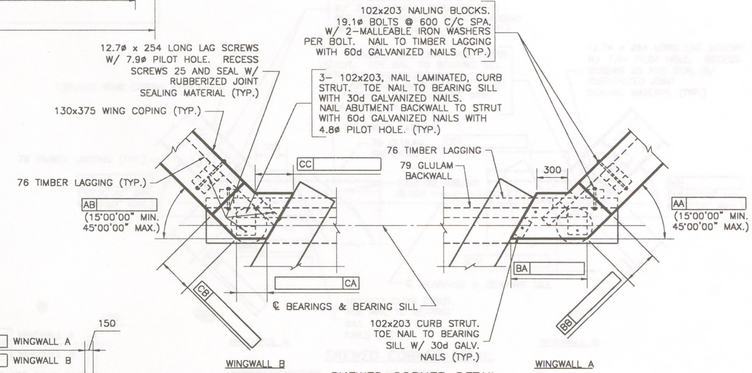
NO SCALE

LEGEND

| | |
|---|---|
| F.G.E. | DENOTES FINISHED GROUND ELEVATION |
| W.P. | DENOTES WORKING POINT |

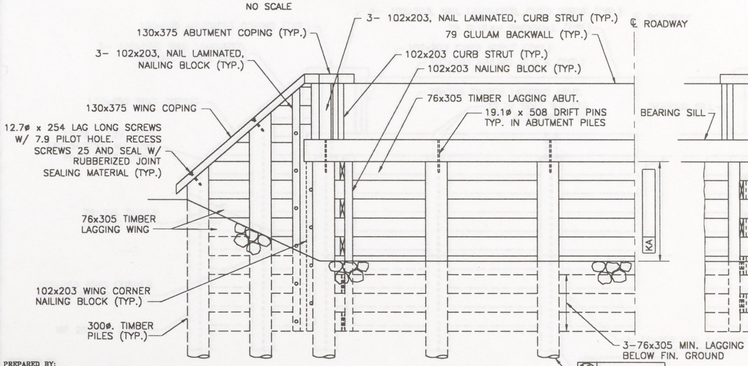
NOTES:

- NOMINAL DIMENSION ARE SHOWN FOR SOLID SAWN TIMBER
- ACTUAL DIMENSION ARE SHOWN FOR GLULAM TIMBER
- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ___
- MAX. ALLOWABLE PILE LOAD = ___ kN.
- MIN. DESIGN PILE LOAD = ___ kN.




SKEWED CORNER DETAIL

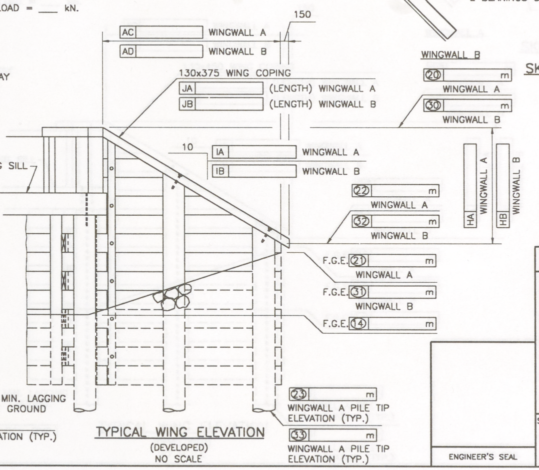
NO SCALE




HALF ELEVATION

(DEVELOPED)

NO SCALE




TYPICAL WING ELEVATION

(DEVELOPED)

NO SCALE

THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

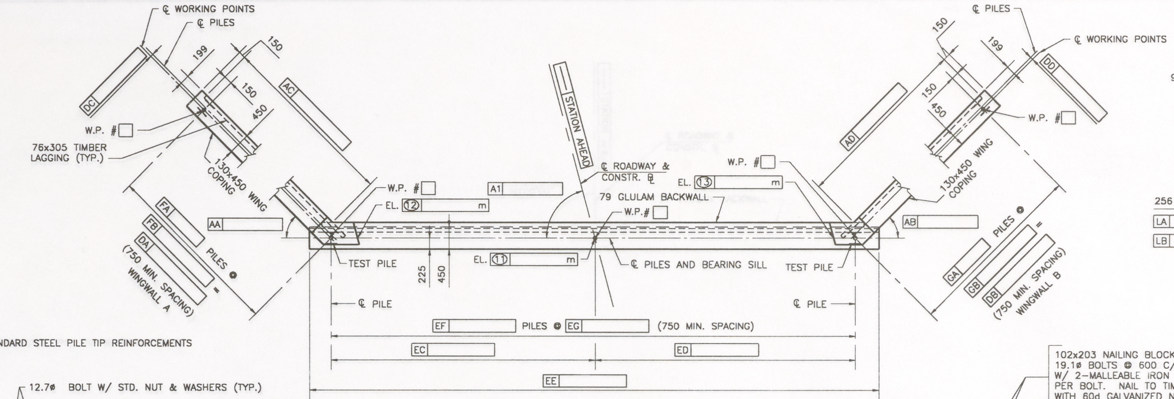
WOOD PILE ABUTMENT ___ – RIGHT SKEW

ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 107M | 3 | PILE SUPPORTED TIMBER SILL |

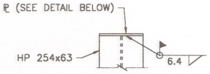
SHEET___of___

PREPARED BY:
POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA



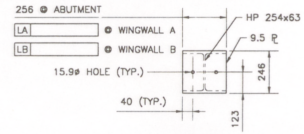

## ABUTMENT PLAN

NO SCALE




## PILE CAP DETAIL

NO SCALE

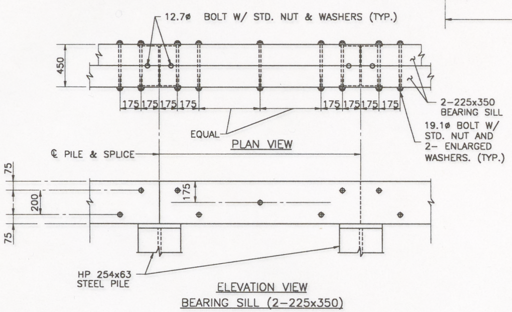



## 9.5 PLATE DETAIL

NO SCALE

**NOTE:**

SEE BC-757M FOR STANDARD STEEL PILE TIP REINFORCEMENTS AND SPLICES.




## BEARING SILL SPLICE DETAILS

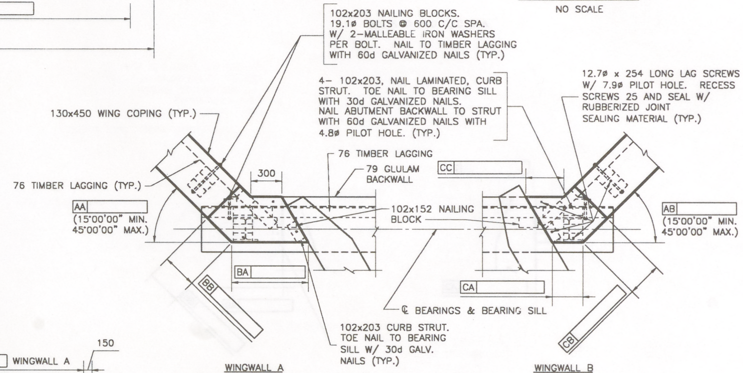
NO SCALE

## LEGEND

F.G.E. DENOTES FINISHED GROUND ELEVATION
W.P. DENOTES WORKING POINT

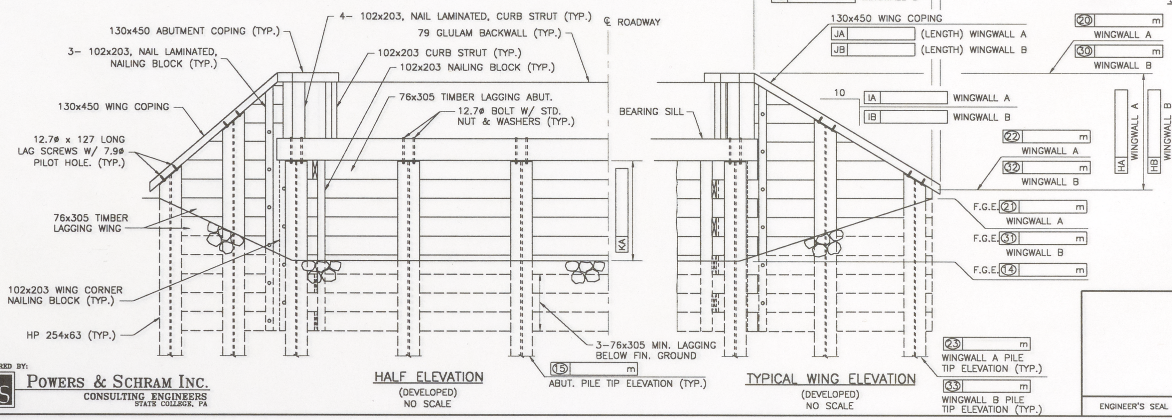
## NOTES:

- NOMINAL DIMENSION ARE SHOWN FOR SOLID SAWN TIMBER
- ACTUAL DIMENSION ARE SHOWN FOR GLULAM TIMBER
- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ___
- MAX. ALLOWABLE PILE LOAD = ___ kN.
- MIN. DESIGN PILE LOAD = ___ kN.




## SKEWED CORNER DETAIL

NO SCALE




THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

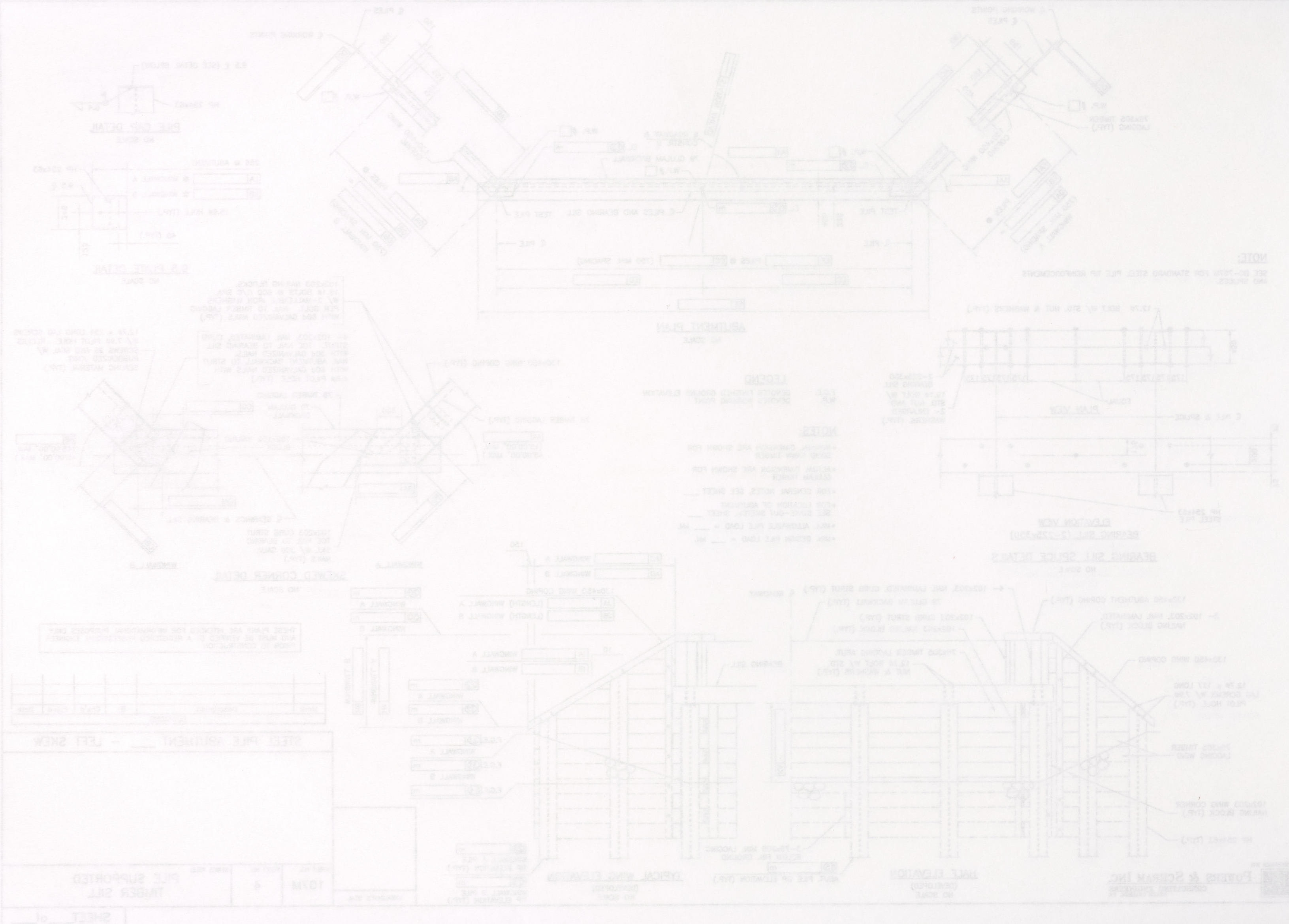
PREPARED BY:
P&S POWERS & SCHRAM INC.
CONSULTING ENGINEERS
STATE COLLEGE, PA

STEEL PILE ABUTMENT ___ - LEFT SKEW

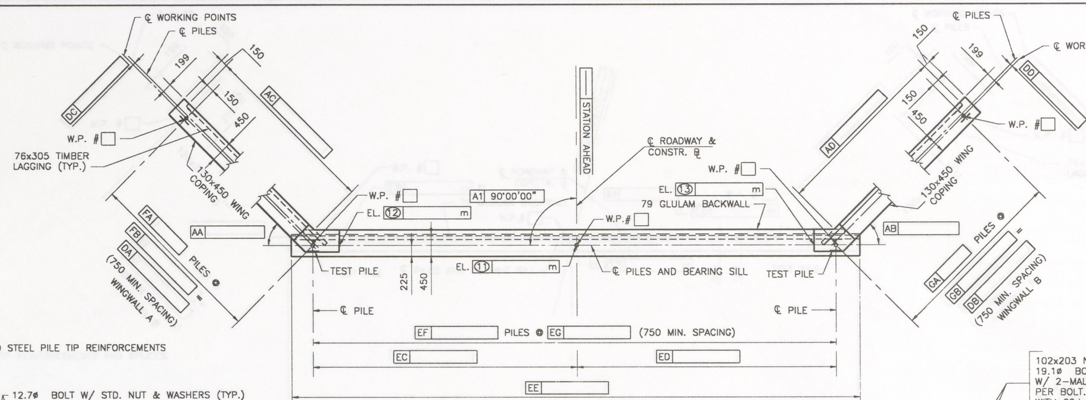
ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 107M | 4 | PILE SUPPORTED TIMBER SILL |

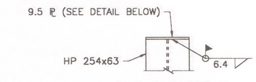
SHEET___of___



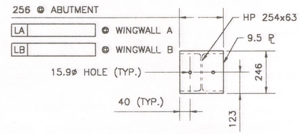
PILE CAP DETAIL
ABUTMENT PLAN
NO SCALE
LEGEND
NOTES
NOTE
PLAN VIEW
ELEVATION VIEW
BEARING SILL SPLICE DETAILS
SKEWED CORNER DETAIL
TYPICAL WING ELEVATION
SILL ELEVATION
STEEL PILE ABUTMENT ___ - LEFT SKEW
PILE SUPPORTED TIMBER SILL
SHEET __ of __




ABUTMENT PLAN
NO SCALE

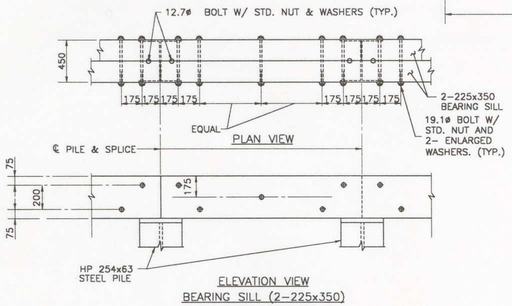



PILE CAP DETAIL
NO SCALE




9.5 PLATE DETAIL
NO SCALE

**NOTE:**
SEE BC-757M FOR STANDARD STEEL PILE TIP REINFORCEMENTS AND SPLICES.



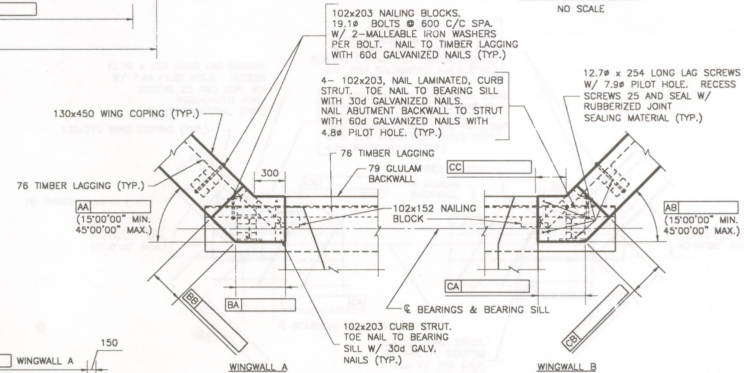

BEARING SILL SPLICE DETAILS
NO SCALE

**LEGEND**

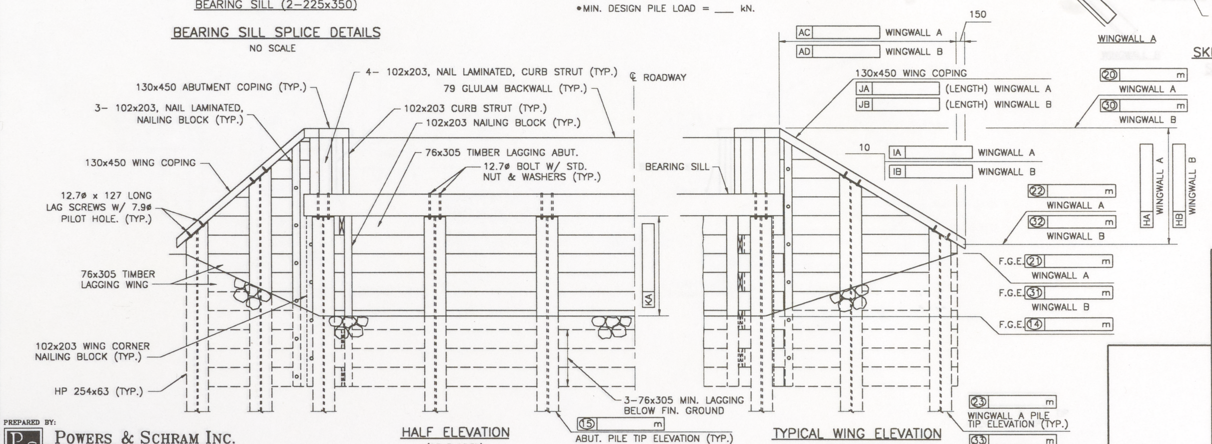
F.G.E. DENOTES FINISHED GROUND ELEVATION
W.P. DENOTES WORKING POINT

**NOTES:**

- NOMINAL DIMENSION ARE SHOWN FOR SOLID SAWN TIMBER
- ACTUAL DIMENSION ARE SHOWN FOR GLULAM TIMBER
- FOR GENERAL NOTES, SEE SHEET ___
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ___
- MAX. ALLOWABLE PILE LOAD = ___ kN.
- MIN. DESIGN PILE LOAD = ___ kN.




SKEWED CORNER DETAIL
NO SCALE




HALF ELEVATION
(DEVELOPED)
NO SCALE

TYPICAL WING ELEVATION
(DEVELOPED)
NO SCALE

THESE PLANS ARE INTENDED FOR INFORMATIONAL PURPOSES ONLY AND MUST BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

STEEL PILE ABUTMENT ___ - 90° SKEW

ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 107M | 5 | PILE SUPPORTED TIMBER SILL |

SHEET___of___

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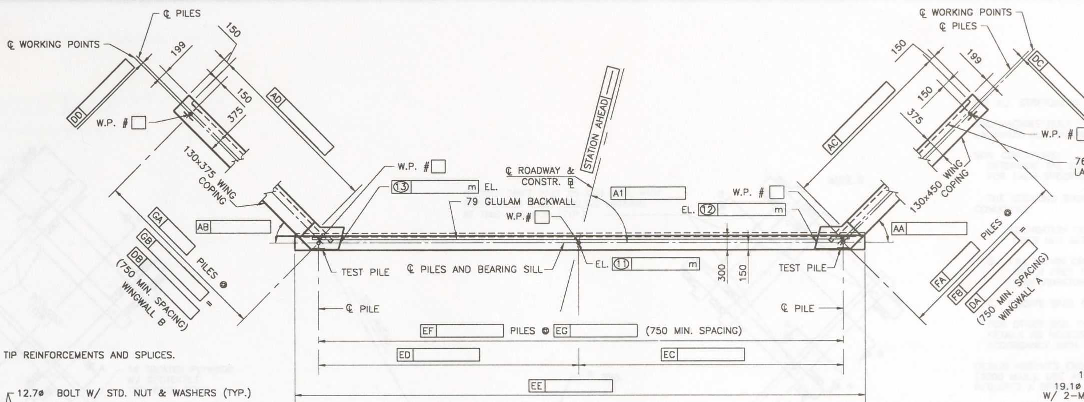
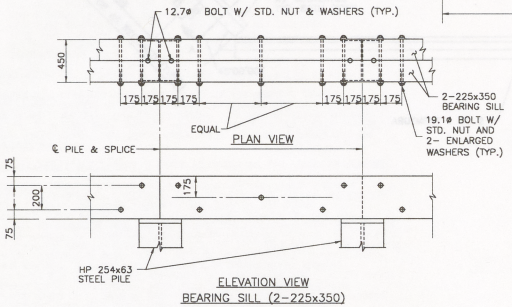



ABUTMENT PLAN

NO SCALE

## NOTE:

USE APPROVED STEEL PILE TIP REINFORCEMENTS AND SPLICES.




BEARING SILL SPLICE DETAILS

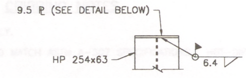
NO SCALE

## LEGEND

F.G.E. DENOTES FINISHED GROUND ELEVATION
W.P. DENOTES WORKING POINT

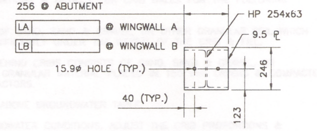
## NOTES:

- NOMINAL DIMENSION ARE SHOWN FOR SOLID SAWN TIMBER
- ACTUAL DIMENSION ARE SHOWN FOR GLULAM TIMBER
- FOR GENERAL NOTES, SEE SHEET ____
- FOR LOCATION OF ABUTMENT SEE STAKE-OUT SKETCH, SHEET ____
- MAX. ALLOWABLE PILE LOAD = ____ kN.
- MIN. DESIGN PILE LOAD = ____ kN.



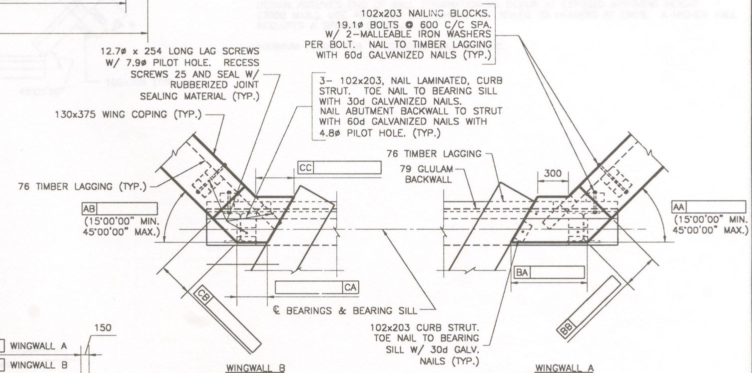

PILE CAP DETAIL

NO SCALE



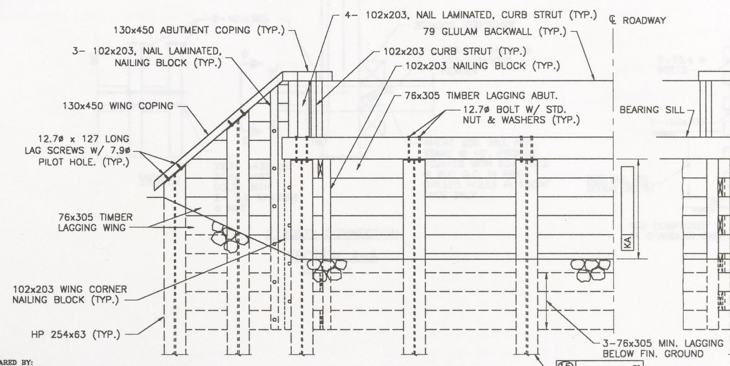

9.5 PLATE DETAIL

NO SCALE




SKEWED CORNER DETAIL

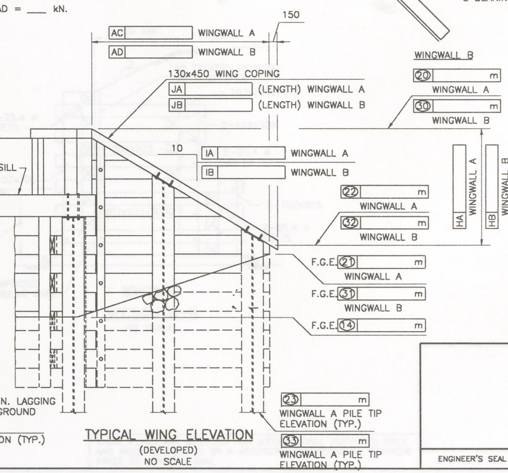
NO SCALE




HALF ELEVATION

(DEVELOPED)

NO SCALE




TYPICAL WING ELEVATION

(DEVELOPED)

NO SCALE

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| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

STEEL PILE ABUTMENT ____ - RIGHT SKEW

ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 107M | 6 | PILE SUPPORTED TIMBER SILL |

SHEET____of____

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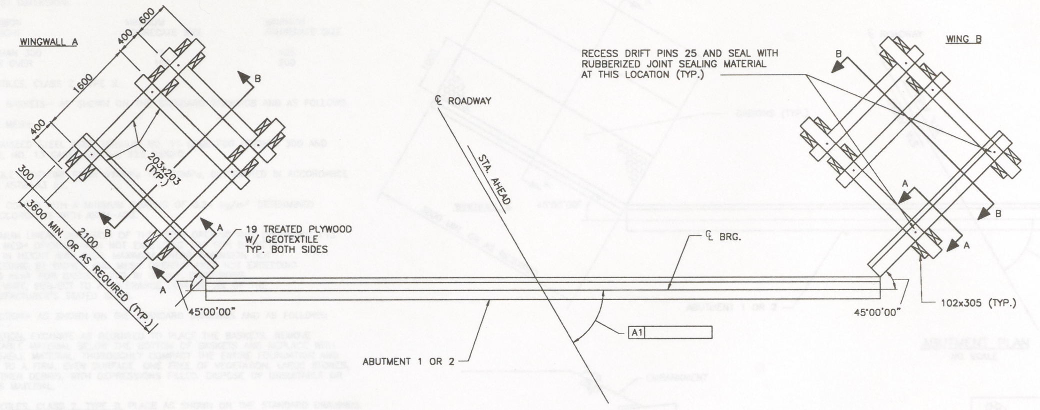



PLAN
NO SCALE

## CRIBBING NOTES

LAY ALL STRETCHERS HORIZONTALLY.

USE MACHINE BOLT FASTENERS TO MATCH ASTM A-307 SPECIFICATIONS. HOT-DIP GALVANIZE ALL HARDWARE.

SOIL CONDITIONS:
DETERMINE THE SOIL & GROUNDWATER CONDITIONS & THE STABILITY OF THE CRIB WALL FOR EACH SPECIFIC CRIB WALL SITE.

THE SECTIONS SHOW PROPORTIONS & DETAILS FOR CRIB WALLS FOR THE FOLLOWING CONDITIONS:

A. FOUNDATION CONSISTS OF SAND, SAND & GRAVEL, OR OTHER GRANULAR SOIL WHICH DOES NOT SETTLE SIGNIFICANTLY UNDER THE WEIGHT OF THE CRIB & FILL.

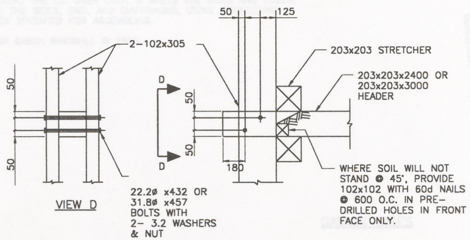
B. FILL WITHIN CRIBS & BEHIND CRIBS CONSISTS OF SAND, SAND & GRAVEL, OR OTHER FREE DRAINING GRANULAR MATERIAL PLACED IN 150 mm LAYERS & COMPACTED WITH VIBRATORY COMPACTORS.

C. LOCATE BASE OF CRIB ABOVE GROUNDWATER TABLE.

FOR OTHER SOIL OR GROUNDWATER CONDITIONS, ADJUST THE CRIB PROPORTIONS & DETAILS AS NECESSARY TO PROVIDE AN ADEQUATE FACTOR-OF-SAFETY IN ACCORDANCE WITH GOOD ENGINEERING PRACTICE.

DESIGN ASSUMES END OF WALL TERMINATION TO OCCUR AT EXPOSED ABUTMENT HEIGHT (3000 MAX.). USE 4900 mm STRETCHERS TOE NAILED TO HEADERS AT ENDS. A HIGHER WALL REQUIRES A SPECIAL DESIGN.

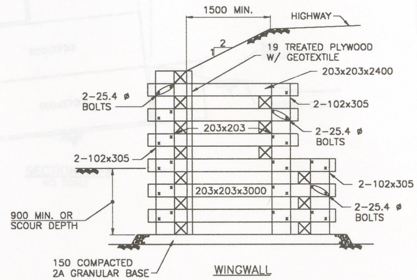
MAXIMUM HEIGHT FOR TIMBER CRIB WALL IS 3000.




VIEW D

2 BOLTS CONNECTION

SECTION A-A
NO SCALE




WINGWALL

SECTION B-B
NO SCALE

| Mark | Description | By | Chk'd | App'd | Date |
|---|---|---|---|---|---|

REVISIONS

# TIMBER CRIBBING WINGWALLS

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ENGINEER'S SEAL

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 108M | 1 | OPTIONAL WINGWALLS |

SHEET____of____

## GABION NOTES

ASSURE THAT MATERIALS AND CONSTRUCTION MEET THE REQUIREMENTS OF:

MATERIAL

AGGREGATE:

PHYSICAL REQUIREMENTS. USE ACCEPTABLE QUALITY AGGREGATE, SOUND, FREE FROM STRUCTURAL DEFECTS AND FOREIGN SUBSTANCES.

SIZE. USE AGGREGATE IN THE FOLLOWING SIZES, MEASURED IN THE GREATEST DIMENSION:

| GABION HEIGHT | MINIMUM AGGREGATE SIZE | MAXIMUM AGGREGATE SIZE |
|---|---|---|
| LESS THAN 300 | 75 | 125 |
| 300 OR OVER | 100 | 200 |

GEOTEXTILES, CLASS 2, TYPE B.

GABION BASKETS– AS SHOWN ON THE STANDARD DRAWINGS AND AS FOLLOWS:

WIRE MESH:

GALVANIZED STEEL WIRE, MINIMUM NO. 11 GAGE FOR HEIGHTS 300 AND OVER, NO. 13 GAGE FOR THE 225 HEIGHT.

TENSILE STRENGHT FROM 414MPa TO 586MPa, DETERMINED IN ACCORDANCE WITH ASTM–A3 92.

ZINC COATED WITH A MINIMUM COATING OF 0.24 kg/m² DETERMINED IN ACCORDANCE WITH ASTM–A90.

MAXIMUM LINEAR DIMENSION OF THE MESH OPENING NOT EXCEEDING 113 AND MESH OPENING AREA NOT EXCEEDING 200 FOR BASKETS 300 IN HEIGHT AND OVER; MAXIMUM LINEAR DIMENSION NOT EXCEEDING 81 INCHES AND MESH OPENING AREA NOT EXCEEDING 3750 mm² FOR BASKETS 225 IN HEIGHT. DIMENSIONS MAY VARY, SUBJECT TO A TOLERANCE LIMIT OF 3% OF THE MANUFACTURER'S STATED SIZES.

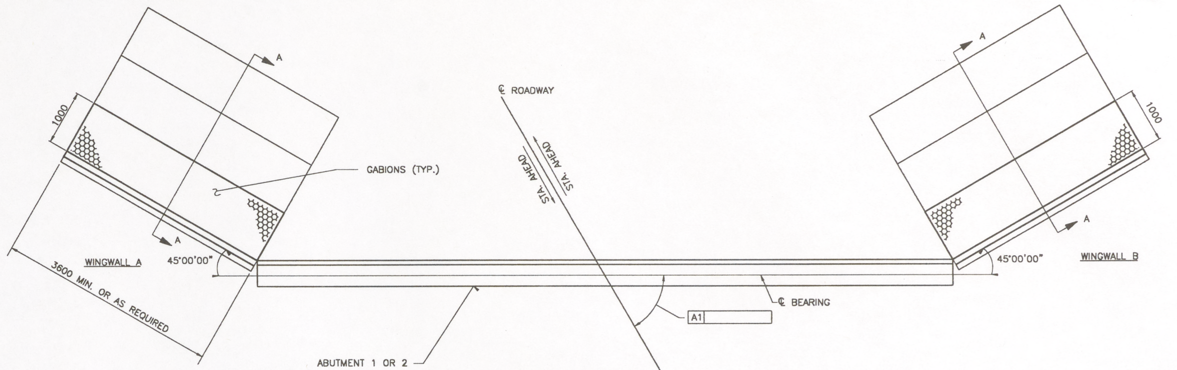
CONSTRUCTION– AS SHOWN ON THE STANDARD DRAWINGS AND AS FOLLOWS:

EXCAVATION. EXCAVATE AS REQUIRED TO PLACE THE BASKETS. REMOVE UNSUITABLE MATERIAL BELOW THE BOTTOM OF BASKETS AND REPLACE WITH ACCEPTABLE MATERIAL. THOROUGHLY COMPACT THE ENTIRE FOUNDATION AND FINISH TO A FIRM, EVEN SURFACE, ONE FREE OF VEGETATION, LARGE STONES, AND OTHER DEBRIS, WITH DEPRESSIONS FILLED. DISPOSE OF UNSUITABLE OR EXCESS MATERIAL.

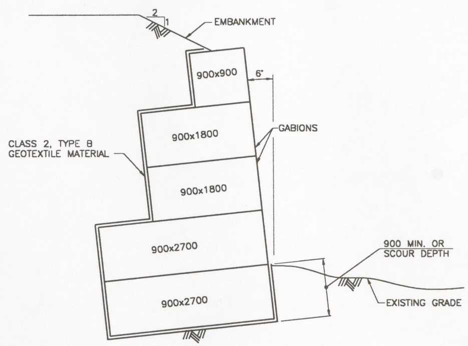
GEOTEXTILES, CLASS 2, TYPE B. PLACE AS SHOWN ON THE STANDARD DRAWINGS.

GABIONS. ASSEMBLE EACH BASKET BY BINDING VERTICAL EDGES TOGETHER WITH A CONTINUOUS PIECE OF CONNECTING WIRE, LOOPED TWICE AROUND THE VERTICAL EDGES WITH A COIL, APPROXIMATELY EVERY 200; ON 225 HEIGHT BASKETS, LOOP THE COILS EVERY 75. SET EMPTY BASKETS TO LINE AND GRADE, AS INDICATED. JOIN THE UNITS TOGETHER WITH CONNECTING WIRE, IN THE SAME MANNER AS DESCRIBED ABOVE. SPACE UNIFORMLY, THEN SECURELY FASTEN INTERNAL TIE WIRES IN EACH OUTSIDE CELL OF THE STRUCTURE, OR AS DIRECTED. WHEN GABIONS ARE BEING PLACED AS SLOPE PROTECTION OR CHANNEL LINING, THE INTERNAL TIE WIRES MAY BE DELETED, IF DIRECTED. FILL GABIONS BY HAND PLACEMENT OF THE AGGREGATE, AT LEAST ALONG THE EXPOSED FACES, FOR A UNIFORM APPEARANCE. WHEN FILLING BASKETS, USE A STANDARD FENCE, CHAIN FALL, OR IRON ROD TO STRETCH THE BASKETS AND TO MAINTAIN ALIGNMENT. CAREFULLY PLACE AGGREGATES IN CORROSION BASKETS, MAKING SURE THE SHEATHING IS NOT BROKEN OR DAMAGED. AFTER A BASKET HAS BEEN FILLED, BEND THE LID OVER UNTIL IT MEETS THE SIDES AND EDGES. SECURE THE LID TO THE SIDES, END, AND DIAPHRAGMS, USING CONNECTING WIRE IN THE MANNER SPECIFIED FOR ASSEMBLING.

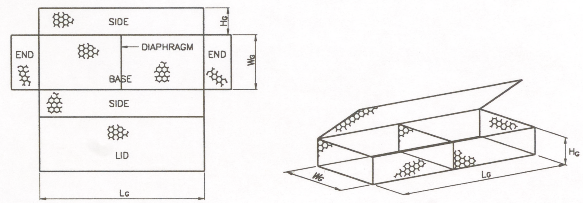
MAXIMUM HEIGHT FOR GABION WINGWALL IS 2400




ABUTMENT PLAN
NO SCALE




SECTION A–A
NO SCALE




WIRE MESH BASKETS
NO SCALE

### GABION SIZES

| STANDARD | | |
|---|---|---|
| $W_G$ | $L_G$ | $H_G$ |
| 900 | 1800 | 300 |
| 900 | 3600 | 300 |
| 900 | 2700 | 450 |
| 900 | 1800 | 900 |
| 900 | 2700 | 900 |
| 900 | 3600 | 900 |

ADDITIONAL SIZES MAY BE AVAILABLE ON A SPECIAL ORDER BASIS.

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ENGINEER'S SEAL

GABION WINGWALLS

| SERIES NO: | SHEET NO: | SERIES TITLE: |
|---|---|---|
| 108M | 2 | OPTIONAL WINGWALLS |

SHEET___of___